THE METAL INDUSTRY
WITH WHICH ARE INCORPORATED
THE ALUMINUM WORLD, THE BRASS FOUNDER AND FINISHER AND ELECTRO-PLATERS REVIEW
A TRADE JOURNAL RELATING TO THE NON-FERROUS METALS AND ALLOYS.

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NEW SERIES
VOL. 5, NO. 7.

EARLY "CIR PERDUE" WORK IN FRANCE AND ITS HISTORY IN OUR OWN COUNTRY.

By John G. Niederer.

The very interesting article on "Cir Perdue Casting" in the February number of The Metal Industry was no doubt read by most every one of your readers with deepest interest, for certainly no system of manipulation in the Arts seems to possess such fascination for the American bronze worker as the art of reproducing work showing such absolute respect for the artist's work and making possible the reproduction of castings from patterns of most complex designs. That could not be thought of in the usual method of false core molding, work in which the interstices present too delicate a section to introduce a sand core. Then the unique skin or epiderm produced is positively impossible of production in sand molding. Who among us devoted to the arts in metal has not marveled at the wonderful reproduction of the models depicting fruits and flowers by this process of casting? How many have dabbled in this art at sometime or other only to find that this method demands from the worker who desires to realize good results most minute care and ever alert attention to conditions of materials with which one is working, as well as surroundings under which one is compelled to perform the various operations. In your article on this method of casting the writer omits to mention the splendid work of the Frenchmen who most persistently underwent all sorts of trials to succeed in reviving this art of casting in the latter part of the seventeenth and the earlier part of the eighteenth centuries. Several of the groups produced by the artists Bouchardon and Girardon were cast a la cir perdue. History also tells us that an effort was made to cast the statue of Henri IV. by this method in the early nineteenth century; this, however, proved a failure. Then we have the early efforts of Honore Gonon, who, although witnessing the failures of Piggiani, who at that time was the head of the plaster cast department of the Louvre, as well as head of the foundry du Roule, was nevertheless inspired by an ardent desire to successfully master this fascinating system of casting. Honore Gonon was at that time a clever sand molder, having won a silver medal from the Athenée des Art for his invention of molding by superposed layers without framework, and he had successfully cast in sand the statue of Henri IV., which had cost poor Piggiani's life, for this clever craftsman had died of worry over the trouble and disappointments caused by the difficulties encountered in producing the statue of Henri the IV. and placing same in position.

From 1818 to 1828 proved ten years of hard study and most trying research and experimenting to Gonon. Fully ten years he spent in studying all records and works treating on this system, and carefully he examined antique bronzes, and all his gains and spare time seemed spent in fruitless essays; yet finally, in 1828, he felt that at last success had finally crowned his sacrifices of a decade, and he then established a foundry for objects of art in Belleville. In the year 1832 he obtained a gold medal for his casting of Duret's Neapolitan fisher in one piece. This bronze is now in the Louvre. From then on his works proved many. One of his best known pieces is David d'Angers's statue of Jefferson for the Capitol at Washington. A number of his pieces were bought by Mr. Walters, of Baltimore, to grace his art gallery, and I believe that some of these pieces have since been presented to the City of Baltimore. These pieces are mostly groups of animals by the sculptor Barye. There are also quite a number of examples of his work in the Louvre Museum. He retired in 1840, having sacrificed all to the art which he had made a success as an art only, for he had not prospered, being supported in his old age by his wife's brother, and he died in the year 1850, being 70 years of age.

His son, Eugene Gonon, born at Paris in 1814, selected his father's career as a bronze molder and caster. He also graduated as a sculptor from the Ecole des Beaux Arts, where he had studied under Pradier. The bronzes made by this clever craftsman and artist are many, and are perfect masterpieces cast a la cir perdue. In 1876 the French Government granted Eugene Gonon a life pension in recognition of his splendid work.

From the foregoing it will be seen that it would be unjust to write a history of cir perdue and not mention these noble craftsmen who worked so well and who did so much for the art world.

The history of cir perdue in our own country is comparatively short, as far as the writer can learn from his interviews with others who have been in the bronze business. To the writer's own knowledge there were no commercial products essayed to any extent, yet the art was understood by a number of the French false core molders, who had become American citizens long before the civil war, but the knowledge of its uncertainty in producing large pieces, unless especially equipped, made them overcautious in taking on themselves the responsibilities of proposing its undertaking by their employers. They knew of the sacrifices made by the Gonons, and they knew, as we know to our sorrow, that in most all cases the commercial end seems the only aim in our own country, even in the most artistic lines. Then why bring sacrifice? Nevertheless, now and then some workman who had the opportunity would produce a few small pieces in "a la cir perdue," and the production would be viewed with amazement by those uninitiated.

About twenty-two years ago a German artist did

considerable work in the way of small floral swage, bouquets, etc., for the various chandelier manufacturers in and about New York City, and the work produced by him was certainly beyond criticism. It was said that he worked by the "cir perdue" system. In 1886 he was engaged by the firm of bronze manufacturers of whose shops I had charge. I then discovered that his system could hardly be called cir perdue, as in his general work he did not use wax at all, but in nearly all cases he would use a gelatine proof of the model and from this he would make as many molds as he desired castings. The advantage of working without wax is that one dispenses entirely with the difficulties made by possible residue caused by the ashes of the burning of the wax. His molds were made of fire clay, sand and plaster of paris.

In the more recent years several foundries in our own country have produced work cast by the cir perdue process with more or less success in a commercial way, but there is even at this day a secrecy maintained about the various operations of this system.

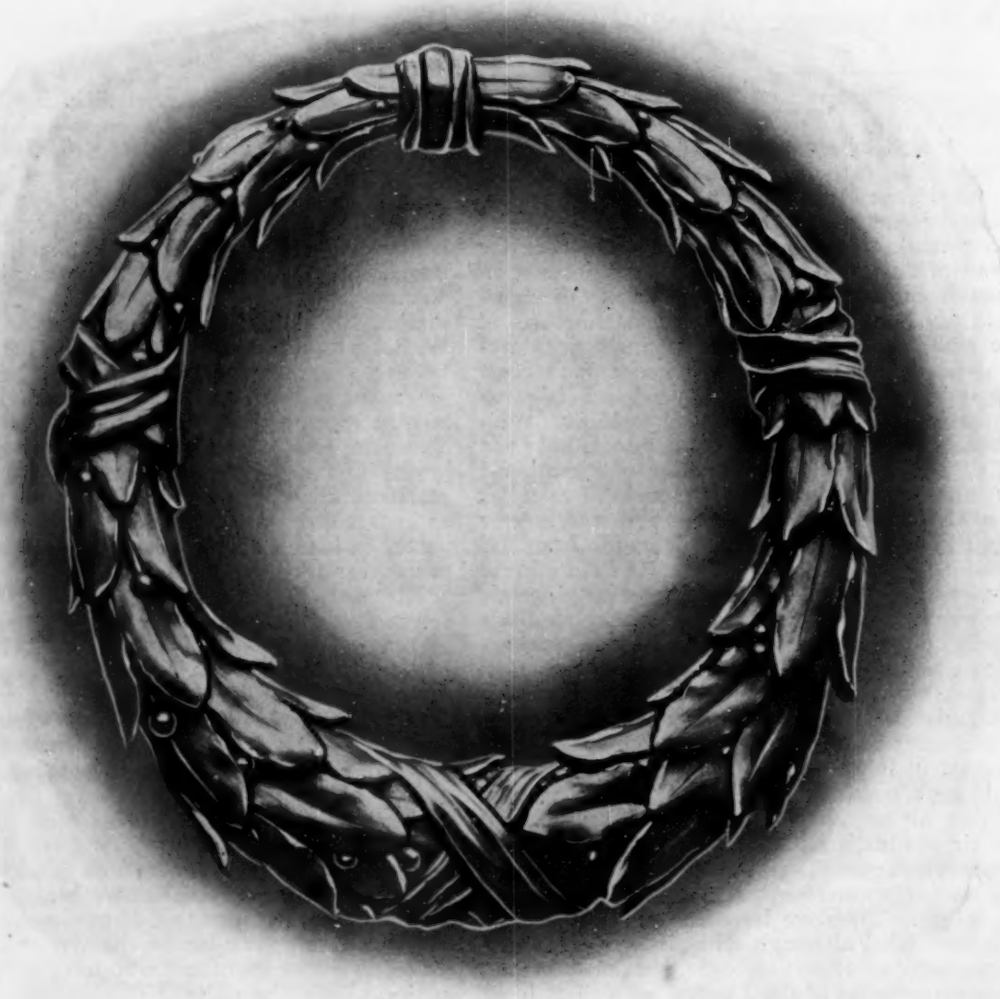
The Gonons used gelatine to produce their wax models. Their composition for the molds was according to a copy made from the description given by Gonon himself.

2 parts crushed and finely screened fire brick.
1 part Belleville sand.
2 parts of molders' plaster.

Where it was desirable to form the outer mold upon the wax model with brush, the following composition would be laid on until a coat of a full centimetre thickness was reached, then rougher means were used until required thickness was obtained:

2 parts Montrouge sand.
1 part yellow ochre.
1 part wood ashes.*
1 part pounded sanguine.
1 part Belleville sand.

*The wood ashes must be boiled until all potash has been drawn out, then the ashes must be washed in cold water. When this is thoroughly done these ashes become infusible at smelting temperature of metal.



GOLD PLATED CAST BRONZE LAUREL WREATH.

The two engravings plainly show the undercutting which it would be impossible to bring out in sand molding. These wreaths were made for the Harrisburg Capitol lanterns, and are said to be excellent productions of the art. Upon inspection the casting will be found perfectly sound, without pin holes, and with most delicate interstices strongly brought out.

For articles to be gold plated:

33 Kilogrammes copper (73 lbs.).
16½ Kilogrammes zinc (36 lbs.).

Light colored bronze:

36 Kilogrammes copper (79 lbs.).
9 Kilogrammes zinc (20 lbs.).
250 Grammes tin (3857 grains).
43 Kilogrammes copper (95 lbs.).
7 Kilogrammes zinc (15 lbs.).
500 Grammes tin (7716 grains).

I have at various times tried the above compositions. The bronzes are satisfactory in every way, though a little light in color. The composition for molds to be applied by brush I have never tried. My workmen have told me that they have used it with good results. The mold composition with fire clay is inferior, in my opinion, to the composition used nowadays, composed of fire brick and plaster, as the danger of vitrifying seems ever present, and in fact is very difficult to avoid when one considers that the mold must be heated to a degree very dangerously near the vitrifying temperature.

VIEW OF WREATH SHOWING THE UNDER CUTTING.

REFINISHING BRITANNIA METAL PLATED WARE.

By F. J. Frost.

Quantities of this class of goods, which are much tarnished and from which the silver plate is partly worn, can be cleaned up at a good profit to the plater for half the price of replating. The appearance of the finished article depends on the amount of use or abuse it has had; much ware, being only badly tarnished, can be made equal to new.

First dip the article into hot potash and rinse in clean water. Then cover with a very light coat of silver, in the silver strike solution. This operation takes the place of a cyanide dip, but is more rapid and efficient owing to the action of the electric current. Then scratch brush the article with a brass wire brush kept wet with water. Care should be taken not to touch plain surfaces of the article that are to be bright. Rinse well, then give another coat of silver in the striking solution. Keep the article in motion to prevent a too rapid deposition of silver. This second striking is practically a two-minute plate and when taken from the solution and rinsed in cold water should appear almost white.

Scratch brush again, using the same care not to scratch the plain surfaces. A well-worn, soft scratch brush is very useful with which to reach engraved places on a plain surface.

The entire surface of the article is then polished with a soft buff, treated with soft rouge. The rouge is prepared as a paste by the addition of water and alcohol and is smeared on the article directly before holding the article to the buff.

No attempt should be made to polish out scratches, as the coat of silver is easily cut through. When this happens the article has to be returned to the plating room to be doctored on the bare places, which is done by holding article on the cathode rod above plating solution and gently applying to the bare places an anode to which is tied a sponge saturated with the solution.

When polished the article is washed out in hot, soapy water containing a few drops of ammonia. The article is then rinsed in cold water, after which it is dipped in hot water and wiped off with a clean linen cloth.

WATCHES AND PLATED WARE IN AUSTRALIA.

Special Agent Harry R. Burrill, in a report from Melbourne, states that gold filled cases, with standard American movements, have struck the popular fancy there, and the demand is steadily increasing. "The guarantee accompanying these filled cases is an important factor in the ready sale they command, but no less important is the reliability of the movement, which, though comparatively inexpensive, has given universal satisfaction so far as known." American plated novelties command a ready sale all over the commonwealth.

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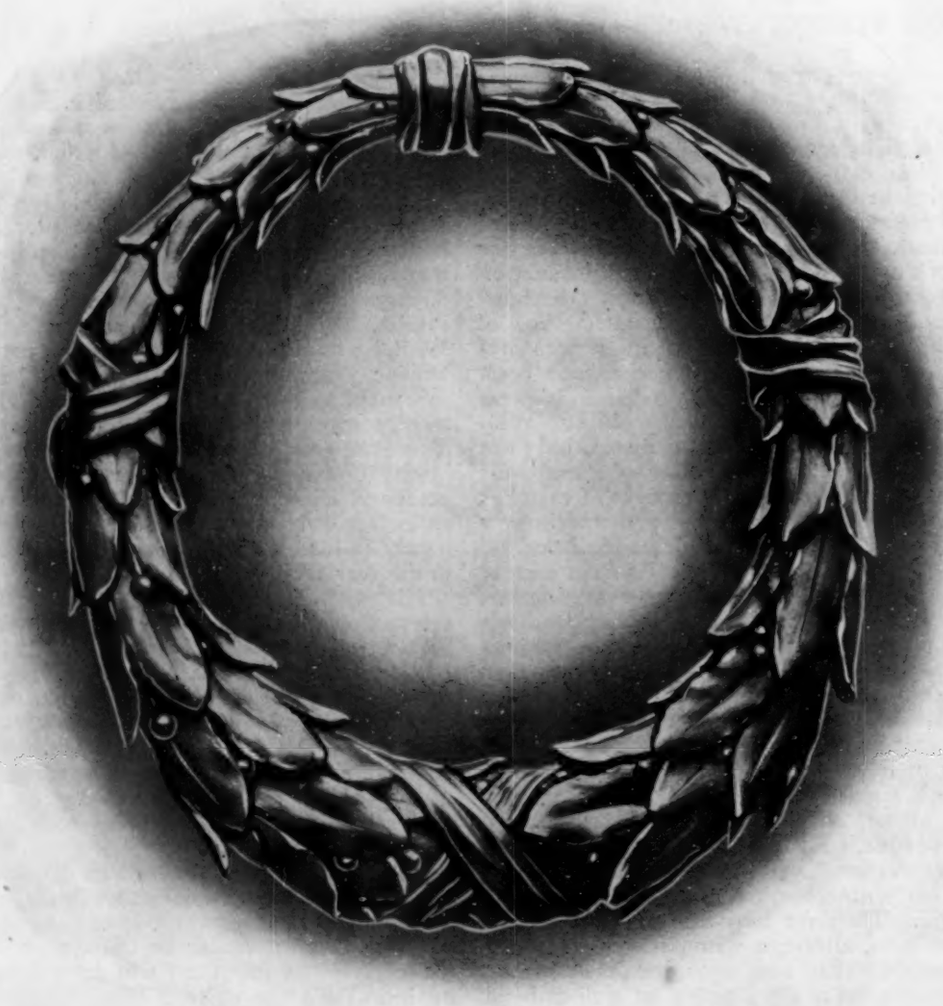

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THE COST SYSTEM OF A CABLE SHOP.

By D. C. Eggleston, M.E.

The work of making lead covered cable naturally falls into two classes, that of making the core of insulated copper wire and that of forming the lead covering to protect the core. Since the processes in each class differ it is necessary to make a division between the expense incurred in connection with the cable core department and that incurred on account of the cable press department.

Two methods are employed in disposing of the cable core departmental expense. That incurred in connection with the insulating machines is disposed of as a loading on labor through machine unit rates. The balance of the expense incurred in connection with purchasing, receiving, handling and storing material is disposed of as a loading on material by using per centages.

In the cable press department taken for illustration here are four presses, two large and two small ones. The presses are not used exclusively for making cable as some lead sleeving is made. All cable requires testing after the lead cover is put on the core, which work is treated in a separate class by itself in distributing cable shop expense. Expense incurred in connection with covering the cable core with lead and in making lead sleeving is disposed of as a loading on the basis of the number of hours the presses are used. The expense of testing is distributed to the various jobs on the basis of the number of hours the operator works.

Reference to the accompanying diagram will show the main divisions of cable plant expense designated by A, B, C, D, E and F respectively. On the left are listed the subdivisions of expense which may be chargeable to one or all of the main divisions of expense. Depreciation is one of the largest amounts to deal with, being the amount necessary to set aside yearly to meet expenses for renewals. The best judgment of an engineer is required to estimate the probable life of a plant. That done, it is an easy matter for the accountant to estimate the necessary amount to be charged against operating expenses on account of depreciation. Insurance and taxes are fixed charges and are not influenced by the activity of the shop. The more hours the plant is in operation the more work the fixed charges will be spread over, thus effecting the economy of manufacture.

Since depreciation, insurance and taxes are distributed on the basis of the face value of the plant it is necessary to have an adequate method of handling the cable plant accounts. Card files and loose leaf books are best adapted for recording information regarding machinery, fixtures and furniture. Elevators, foundations for heavy machines and scales are permanent fixtures and since they are not likely to be moved after installation they are recorded on large loose leaves perforated to fit into a binder. Racks, shelves and temporary partitions are classed as fixtures and information regarding them should be recorded in sufficient detail on cards to facilitate identification. Cards are also best suited for recording information regarding furniture and machinery. Numbers should be assigned fixtures, furniture and machinery and stamped or fixed on them as far as possible. The cards can be filled according to location and periodically checked with an inventory. A summation of the cards filed under the head of a department gives the amount which is the basis for assessing depreciation, insurance and taxes.

CABLE PLANT EXPENSE

	A	B	C	D	E	F
	Cable Core Dep't		Cable Press Dep't			
	Mach. Exp.	Mat. Exp.	Large Presses	Small Presses	Press Wk. not Cable	Testing
1. Depreciation						
2. Insurance						
3 Taxes						
4 Power						
5 Rent						
6 Administration						
7 Supplies						
TOTAL						

Chart illustrating method of dividing Cable Plant Expense

The cost of power is a considerable item not only for running the insulating machines but also for running the large hydraulic lead presses. Where the cable shop is a part of a large plant transfers of power expense are made on the basis of the amounts used as shown by meter readings. Steam is used for heating the large ovens in which the core is thoroughly dried before the lead covering is put on. Steam power is used for running the large pumps and electric power for driving the insulating machines in the shop taken for illustration. Rent items include charges for making repairs and changes to the building and such fixtures as are classed as rent fixtures. All cleaning and sweeping is chargeable to rent expense. This account is prorated on the basis of the number of square feet of floor space occupied.

There are a number of non-productive workers in the

cable plant, foremen, assistants and clerks. The salaries of such men are chargeable to administration expense. The rent of their offices, stationery used and fixed charges on furniture should also be included in this division of expense. The administration expense account is prorated to the cable core and press departments on the basis of the number of productive operators in each.

Of course there are many supplies and small tools used which are provided for under the head of sundry expense. These should be assessed against the various classes of work by estimate and analysis. Gas is a sundry expense assessable against press work on the basis of the number of burners used.

Of the five classes of expense three are described as machine expense, one as material expense and one as tsting expense. Machine expense is disposed of as a loading on labor through machine unit rates which are found by dividing the expense for a certain period by the normal number of working hours for the period. In the case of lead presses this is as much as $1.50 to $2.00 an hour according to the size of the press. Letters indicative of the hourly machine rates are stamped on metal tags and fixed to the machines and written on the operator's job ticket. Material expense is disposed of as a loading on a percentage basis. All expense incurred in testing cable is disposed of as a loading on labor through hourly rates. Letters indicative of the hourly rates are written on the cable test time tickets so that the rates can be extended simultaneously with the operator's time. Thus we see that we have the machine hour rate, percentage on material method and productive hour rate for distributing cable plant expense.

All work is done on foremen's orders to which raw material, labor and expense are charged. The time tickets are daily forwarded to the pay roll department and after the pay rolls have been posted they are sent to the shop cost department where they are filed behind guide cards. When the job is completed they are removed and the labor and expense summarized. The raw material used is entered from the stores keeper's stock slip on the cost summary. The material labor and expense gives the total cost of production.

TEA LEAD.

The manufacture of tea lead, once a very flourishing industry of the "East Side" of New York City, has been abandoned, not only in this city, but in this country also. Originally it was composed of 50 per cent. lead and 50 per cent. tin, the composition of half and half solder, but owing to price of tin rising, the amount of tin has gradually been cut down until now it contains but 3 per cent. tin and 97 per cent. lead. It is very easily rolled with ordinary sheet lead rolls, the 3-foot rolls being used. The slabs are cast about 1,000 pounds each and the rolls set down about 1-64 with each rolling.—L. B.

NICKEL TO PAY 45 PER CENT.

According to a recent decision of the United States General Appraisers nickel plates will have to pay a higher duty. The plates in question were 36 inches long, 8 inches wide and ½ an inch thick. They are assessed for duty under the provision of the tariff law for manufacture of metal not specifically provided for at the rate of 45 per cent ad valorem. Hermann Boker & Co., of New York, the importers, claimed that they came under the provision covering nickel in pigs, bars, etc., where the duty is 6 cents a pound. The ruling was that they should be assessed at 45 per cent ad valorem.

ALLOYS FOR RAILWAY BEARINGS.

At the meeting of the American Society for Testing Materials held at Atlantic City, June 20th to 22d, a paper was read by G. H. Clamer on "The History and Development of the Alloy Practice in the United States as applied to Railway Bearings."

In the earliest days of railroading, the alloys used for bearings were those which had been used in general machine construction. The favorite alloy seemed to be copper and tin. The prevalent idea in those days was to make the alloy as hard as possible. It was well known that tin, when added to copper, hardened it greatly, so naturally as much tin was added as was possible without making the alloy too brittle. Bearings were made with tin as high as 80% copper and 20% tin, in reality, bell metal, and from this down to 90% copper and 10% tin. For many years, 87½% copper and 12½% tin was considered the standard of excellence, and is still specified by some roads, although these specifications are seldom enforced, as the mixture to-day is considered entirely too expensive.

Until 1887, the copper-tin alloy, 87½% copper and 12½% tin, was considered the standard. This was principally the reason because the manufacturer of railway bearings, for 17 years before that time, had practically been in the hands of one company, that of D. F. Hopkins. Hopkins, in 1870, invented his lead-lined car bearing. This invention consisted of nothing more than the application to the bearing surface of a thin lining of lead. The lining he applied by first tinning the journal surface of the bearing, and then placing it against a mandrel, and pouring as thin a lining as possible of pure lead, between the bearing and the mandrel. The molten lead attaching itself firmly to the tinned surface of the bearing. This produced what Hopkins called a self-fitting bearing.

Before the expiration of the Hopkins patent, Dicks, in England, took out a patent on the introduction of lead and phosphorus into the copper and tin alloys for bearings, claiming that the lead added to it's efficiency. This is the alloy still largely used and known as Standard Phosphor Bronze Bearing Metal. It was manufactured by the Phosphor Bronze Smelting Co., and became known as the "S" brand. The "S" brand, having a composition of 80 parts copper, 10 parts tin, 10 parts lead, and 1 part phosphorus, was adopted by the Pennsylvania Railroad, as a result of a series of tests made by Dr. C. P. Dudley and his associates. They proved what had already been a fairly well founded superstition, that the addition of lead to the copper and tin alloy was really of very material benefit, not only in so far as the liability towards bearing was concerned, but that it also decreased the rate of wear. The phosphorus was added for it's beneficial influence in the foundry.

As a result of his experiments, Dr. Dudley drew up a specification, probably the first one governing the composition of an alloy for railway bearings. It was that of the Phosphor Bronze "S" Bearing Metal, and prescribed certain limits for each constituent, and a limitation on impurities.

It read as follows:

Copper	78 to 80
Lead	8 to 11
Tin	9 to 11
Phosphorus	.7 to 1%

All ingredients foreign to above not over .33%.

Some time after the introduction of the phosphor bronze bearing metal F. J. Clamer commenced the manufacture and sale of metal containing:

Copper	77 parts
Tin	11.5 "
Lead	11.5 "

without the use of phosphorus. This was about 1876. It was found difficult to introduce it. For engine bearings, however, it found favor and sales increased steadily. In 1880 the Ajax Metal Company took over the manufacture and sale.

Dr. Dudley appears to be the first, and perhaps the only one, who has actually taken in hand a practical and scientific study of the alloys for railway bearings. About the year 1890 he conducted tests on the "S" brand phosphor bronze previously mentioned and drew the following conclusions:

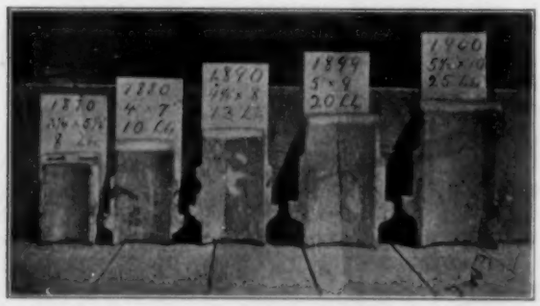
First—Phosphor bronze showed less tendency to heat.

Second—Phosphor bronze showed a slower rate of wear.

Third—The phosphorus in the alloy apparently did not affect materially the performance of the bearings in service and is added only for beneficial influences in the foundry.

Fourth—The superiority of the "S" brand phosphor bronze is therefore due to the lead which it contains.

It now became a question as to how much lead should be added and also what relationship the quantity of tin had on the properties of the alloy. With these questions in mind, further tests were conducted which resulted in the establishment of the following facts:



DEVELOPMENT OF CAR BRASSES.

First—Wear diminished with the increase of lead.

Second—Wear diminished with the diminution of tin.

Third—The tendency to become heated decreases as the lead increases and the tin decreases, or, in other words, as the plasticity of the alloy is increased.

At this point the work on the copper, tin and lead alloys was taken in hand by Joseph G. Hendrickson and G. H. Clamer. They conducted experiments first with the idea in mind of introducing some element which would cause a quick chilling or rapid setting of the metal after entering the mold. After trying additions of practically all the high melting point metals they found that nickel was the only one which really gave satisfactory results. It was found to alloy readily with copper and tin and cause rapid chilling; at the same time it increased the tensile and compressive strength. Also by using nickel they were able to increase the lead considerably over 15%, while still maintaining tin at 8 to 10%.

It was also found possible to lower the tin content and even to entirely dispense with it and still secure a satisfactory alloy for casting, the alloy of copper and lead being found to be more homogeneous when nickel was added than copper and lead alone, although there was not found to be any advantage to be gained by substituting nickel for tin in order to get the same amount of hardness. Further than this it was found possible to make alloys with small amounts of tin and large amounts of lead without any nickel or addition of high melting point metal. This was a great surprise, as there had always been a deeply rooted idea in the trade that such an alloy could not be made successfully. This was proved to be erroneous and as the result of many experiments it was found that it was entirely due to diminishing the tin from the previous standard, *i. e.*, 8 to 10%; that it was possible to proportionately increase the lead as the tin was diminished, stopping only at such a point with the increase in lead and decrease in tin when the compressive strength was so diminished that thoroughly practical and commercial bearings no longer resulted.

This point was found to be:

Tin	5%
Lead	30%
Copper	65%

This alloy is largely sold under the name of "plastic bronze." It has a compressive strength of about 15,000 pounds per square inch and is found to operate without distortion on the bearings of the heaviest locomotives in service, it being used not only for driving brasses but also for rod brasses and bushings, in which capacity considerable thrust is encountered. It is also used in vast quantities on cars of 100,000 pounds capacity, which are the largest cars in service.

Microscopic investigation showed that the lead is only mechanically held in the alloy, the copper and tin forming a network or matrix which acts as a supporting structure for the lead and gives to the alloy its strength and hardness.

There has also been used continuously since about 1887 vast quantities of bearings which are made entirely from scrap, such bearings having a composition as follows constitute from 50% to 75% of the car bearings used to-day:

Copper	65 to 75
Tin	2 to 8
Lead	10 to 18
Zinc	5 to 20

For the linings of car brasses the general tendency was to increase their weight after the expiration of the Hopkins patent. With this increase in thickness it became necessary to add hardening metals. Antimony and tin have accordingly been added for this purpose in varying proportions, and at the present time with lining 5/16" and ⅜" thick as much as 15 to 20% antimony is used.

AMERICAN GRAPHITE AND IMPORTATIONS.

The United States Geological Survey reports a very considerable increase in the production of graphite for the year 1905. The production of crystalline graphite in New York and Pennsylvania was 6,036,567 pounds, with a value of $237,572. The graphite produced in Georgia, Wisconsin, Michigan, Alabama, North Carolina, Rhode Island, Colorado and Nevada is classed as amorphous and totaled 21,953 tons, valued at $80,639. The importation of graphite in 1905 amounted to 17,456 tons, valued at $983,034, an increase of almost 10 per cent over the previous year. The production of artificial graphite has steadily increased since its introduction on the market in 1897. The quantity manufactured in 1905 in the United States amounted to 4,591,550 pounds, valued at $313,980. The average price per pound was 6.38 cents, whereas the natural product was not quite 4 cents.

New zinc deposits are the feature of the mining industry. New South Wales and Mexico have developed into producers of ore of the first magnitude. Supplies are also being received in Europe from Japan and Turkey.

PRODUCTION OF SPELTER AND BRASS IN THE UNITED STATES.

By Andrew M. Fairlie.*

Progress in the zinc smelting industry in the United States during the past two or three decades has been manifested in two ways: In an increased tonnage as recorded in the sales books and in the development of the manufacture of by-products. The latter have become so numerous and the uses of metallic zinc itself are so diversified that the collection and tabulation of statistics relating to the metallurgy of zinc is no easy task. Statistics on spelter production are complicated by the fact that a part of the spelter is rolled at the smelters and appears on the market in sheet form. Similarly a large share of the zinc oxide produced is used at the smelter for the manufacture of white pigment—*e. g.*, lithopone—and is marketed as a paint. Considering the other activities of the zinc smelters, such as the manufacture of sulphuric acid and spiegeleisen and the recovery of the gold and silver contained in the ores, it is plain that a statement of spelter production is by no means a complete record of what the zinc smelters are doing.

The United States census[1] gives the production of spelter for the census year ended May 31, 1880, as 23,239 short tons. For the calendar year 1889 the same authority shows an increase to 58,860 short tons and for the calendar year 1899 131,546 short tons, both the latter quotations including the production of sheet zinc manufactured at the smelters.

The twelfth census of the United States classifies the zinc industry into two groups. The first includes the works located in Illinois, Indiana, Kansas, Missouri and Wisconsin—smelters which buy their ore in the open market. The second group comprises works which control nearly the whole of their own ore supply and the mines and smelters are situated in New Jersey, Pennsylvania and Virginia.

The following table[2] purports to be a complete list of all the works in the United States producing zinc or zinc oxide from ores at the present time. It does not claim to include the smelters of scrap zincs or the refiners of galvanizing dross:

Name.	Location.
American Zinc, Lead & Smelting Co.	Caney, Kan., Dearing, Kan.
Bertha Mineral Co.	Pulaski, Va.
Cockerill Zinc Co.	Iola, Kan.,[3] Altoona, Kan., Pittsburg, Kan.
	Nevada, Mo., Rich Hill, Mo.
Edgar Zinc Co.	St. Louis, Mo., Cherryvale, Kan.
Granby Mining & Smelting Co.	Neodesha, Kan.
Grasselli Chemical Co.	Clarksburg, W. Va.
Hegeler Bros.	Danville, Ill.
Illinois Zinc Co.	Peru, Ill.
Lanyon Zinc Co.	Iola, Kan.[4]
Lanyon-Star Smelting Co.	Bartlesville, I. T.
Matthiessen & Hegeler Zinc Co.	Lasalle, Ill.
Mineral Point Zinc Co.[5]	Mineral Point, Wis.,[6] North Chicago, Ill., Depue, Ill.
New Jersey Zinc Co.	Bethlehem, Pa.,[7] Palmerton, Pa.
Ozark Smelting and Mining Co.	Joplin, Mo., Coffeyville, Kan.
Pittsburg Zinc Co.	Pittsburg, Kan.
Sundoval Zinc Co.	Sandoval, Ill.
United States Zinc Co.	Pueblo, Colo.
United Zinc & Chemical Co.	Iola, Kan.

From this table it appears that since the publication of the census report Indiana has retired from the list of zinc smelting States and Ohio, Colorado and Indian Territory have entered the field.

It is still plausible, however, to divide the zinc smelters with the two groups adopted in 1900 by the Census Bureau, viz.: (1) Those in the Western States, which buy Western ore in the open market, and (2) those in the Eastern States, which own or control their mines. Smelters of the second class, on account of the remarkable purity of their ore, are enabled to produce a high grade spelter of a quality which is not approached by the zinc producers smelting the impure ores of the West. Up to about 1901 the Western spelter was made almost entirely from ore mined in Wisconsin and the Joplin district of Missouri-Kansas and while certain smelters produced superior brands from selected ores, the product was marketed chiefly as prime Western. Since 1901 the importance of the far West as a zinc ore producer has increased and the prime Western spelter is now produced largely from ore mined west of the Rocky Mountains.

As distinguished from the ore-smelting States, the zinc ore-producing States and Territories of importance are: Colorado, Missouri-Kansas, New Mexico, New Jersey and Wisconsin. In 1906 New Jersey led in the production of zinc ore with an output of 404,690 short tons. Only a small part of this product, however, was used for making spelter in this country, the bulk of the New Jersey ore being used for oxide manufacture and for export to Europe. The production of ore in the other important States in 1906 was in short tons: Missouri-Kansas, 283,500; Colorado, 114,000; Wisconsin, 42,130; New Mexico, 30,000.[8]

The production of brass can be estimated roughly from the amount of spelter annually consumed by the brass manufacturers. It is unfortunate that it should be necessary to arrive at the estimate in such a roundabout way. Any attempt to secure statistics of output direct from the brass manufacturers would be confronted by serious obstacles. Some manufacturers are averse to giving statistics for publication, but when the producers understand that the figures would be published collectively so that the operations of individual factories would not be revealed it is believed their reticence will be overcome. A more serious difficulty is the uncertainty of many manufacturers, particularly the smaller ones, regarding the amount of new brass annually produced by them. The practice of remelting scrap in unweighed amounts along with new metal renders a record of the daily tonnage of the casting shop of doubtful value. This record could be corrected at the end of the year by means of invoices of copper and spelter purchased, making allowance for shrinkage, stock of raw metals on hand, etc., but such a method of computation involves considerable clerical work at each individual plant, and it would be hard to induce managers who are not in the habit of collecting such statistics for their own use to compile them for the use of others. A simpler method would be to keep a record of the daily consumption of raw metals and to add together all the daily figures at the end of the year and apply the necessary corrections for shrinkage and loss.

Walter Renton Ingalls has collected statistics of spelter production and consumption in the United States for 1905 and 1906 and his figures are given in the following table:

	Short Tons.		Per Cent. of Total.	
	1905.	1906.	1905.	1906.
Total production	201,748[8]	225,494	....	....
" consumption	199,254	225,500	....	....
Consumption by galvanizing industry	100,000	124,000	50.00	55.00
" " brass "	52,000	57,000	26.00	25.25
" " sheet zinc "	34,000	36,000	17.00	16.00
" " other industries	13,254	8,500	7.00	3.75

These figures were compiled in part from reports re-

*Secretary American Brass Founders' Association, McCays, Tenn.

[1] Twelfth census of the United States. Bulletin No. 124, p. 22.

[2] Compiled from *The Engineering and Mining Journal, April* 20, 1907, p. 775.

[3] Two works.

[4] Three works.

[5] A branch of the New Jersey Zinc Co.

[6] Produces zinc oxide.

[7] Produces both spelter and zinc oxide.

[8] *Engineering and Mining Journal,* May 18, 1907, p. 938.

ceived from consumers, and since it is never possible to get returns from the numerous small consumers of spelter the statistics must be accepted as approximations only. The returns from the brass industry were more complete for 1906, Mr. Ingalls explains, than for 1905, and it is probable that the consumption of spelter in the brass industry for 1905 was underestimated.

Accepting the estimate of 57,000 short tons as the consumption of spelter in the brass industry during 1906, the tonnage of brass manufactured is estimated by multiplying 57,000 by 3 on the assumption that brass carries, on the average, 33⅓ per cent zinc. The estimated production of new brass during 1906 was therefore 171,000 short tons, as against 156,000 tons for 1905, estimated in the same way.

These estimates must be accepted with caution, as they are based on uncertain data. In the first place the reports of spelter consumption in the brass industry are incomplete. Furthermore, the average percentage of zinc in brass may be lower or higher than the figure adopted. The volatilization of zinc in brass manufacture is an unknown quantity and there are unknown losses of metal in skimming, pouring, etc. More reliable estimates of brass production could be made with the help of trustworthy statistics on the consumption of copper in the brass industry as well as of zinc. An effort will be made to collect such statistics for 1907 and it is hoped that all brass manufacturers will co-operate in the endeavor to obtain facts regarding the magnitude of the industry.

PARTING COMPOUNDS.

By W. J. Reardon.

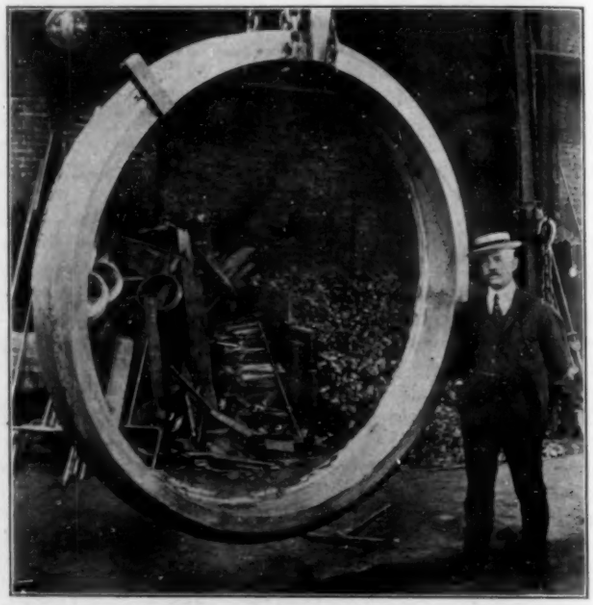
Foundry making brass and bronze castings where sharp outlines must be obtained, parting dust or compound forms one of the essential points of the moulding of the casting, as well as the preparation of the mould and selection of the molding sand. It has been generally conceded that lycopodium is one of the best partings for this class of work, but on account of its high price many substitutes have been offered both here and in Europe, and adulterations of lycopodium have been offered. To test lycopodium, dust some over the surface of a vessel filled with water, then dip the finger well into the vessel; upon withdrawing the finger you will notice a fine coating remains, which to the touch is perfectly dry. Dip your finger now into the dry powder. You will notice no such coating remains and only a small amount of the powder adheres to the folds of the skin. Lycopodium is frequently adulterated with pine pollen, starch, sand, etc. When used as a facing powder it is necessary to moisten the mould on the face of the pattern. If the pattern be wood or plaster the continual moistening will injure it. If the pattern be iron or metal the moistening process takes considerable time.

Lycopodium is the seed of a club moss, is odorless, tasteless, floats on water and burns very quickly. It is valuable as a facing powder. There are a dozen or more varieties of lycopodium growing in the winter states, but most of the lycopodium is imported. The rag weed has a pollen or dust that might be collected and used as a substitute.

There are, however, a number of very good substitutes for lycopodium as a parting compound for moulding on the market. One that the writer has been using with success is called "Reliable" parting or perfect parting. It covers more surface than any of the other compounds I have tried, and can be applied to a high polished surface without moisture, and the price is 20 cents per lb., against 60 cents for lycopodium. There is also a number of other compounds that are very good, as the price is far less than lycopodium and goes almost as far. They are also far superior to charcoal, beam dust, rosin, etc., and for the small amount it takes to insure perfect lifts on molding machines it pays to use some of the good compounds that have replaced lycopodium to a certain extent, especially where castings are light and subject to water and steam pressure tests it will be found a paying investment to the foundry.

THE LARGEST BRONZE GEAR WHEEL CASTING EVER MADE.

The William Cramp & Sons Ship & Engine Building Company, of Philadelphia, Pa., recently finished for Morse, Williams & Company, of the same city, the largest bronze gear wheel casting ever made. This gear and its worm will be used on the marine railroads by the Marine and Fisheries of Canada, Government



THE LARGEST BRONZE GEAR WHEEL.

Shipyard, at Sorel. The gear is of the Hindley type, 86 inches pitch diameter, 10 inches face and 3 inches pitch. It weighed 3,948 pounds after it was cleaned, but 7,004 pounds of Parsons' manganese bronze were melted, the extra amount of metal being necessary for the gates, heads and runners.

The steel worm weighs 1,067 pounds and is 20 inches long over all, 14 inches being length of thread. It has four teeth in actual contact with the wheel. The worm is made of 40 carbon forged steel.

The Parsons' manganese bronze was melted in 8 No. 275 crucibles, each holding about 600 pounds, and 6 No. 150 crucibles, each holding about 350 pounds, and was then emptied into a 4-ton crane ladle and the mold filled direct from the large ladle.

These gears are good for a safe load of 35,000 pounds on the pitch line at 300 revolutions of the worm.

A French method of separating copper and tin consists in casting the scrap into crude plates and then recovering the copper electrolytically.

"ELECTRO ANALYSIS."

Birmingham (England) Expert's Ideas of Its Merits

(By Our British Correspondent.)

The method of analysis by electricity is attracting a large amount of attention among British metallurgical experts, and "Electro Analysis" was the subject of a lecture given by Dr. Slater Price, D.Sc., Ph.D., at the Technical School, Birmingham, on April 22d, before a largely attended meeting of the Metallurgical Society, which included a number of analytical chemists from large Birmingham manufactories.

The lecturer devoted the first part of his lecture to the principles which underlie the methods used in the quantitative deposition of metals by means of the electric current. The ordinary Daniell method was considered, and copper and zinc were treated as examples of the operation of electrolysis, especial reference being made to the complications which arise owing to the deposition of hydrogen at the cathode, and to the action of depolarizers.

The lecturer said that at many of the works they worked by the rule of thumb and tried until they got a good result, and when they had got it stuck to it, whereas if the works manager would go to the necessary expense and obtain proper apparatus he could get a good result in five minutes, saving both his money and the workmen's time. They could get a deposit of copper from a solution of copper sulphate in ten minutes. The rotative electro was a comparatively recent development. He did not think electrolitic analysis would banish the ordinary analysis. But future chemists would probably combine both methods. Some methods of chemical analysis were very quick and could not be improved, but a combination of the two would effect a considerable saving of time.

The chairman said that there was a great gain in the fact that some of the results now obtained in ten minutes had in the past commonly occupied fourteen hours, and he knew of no department in which such an enormous revolution had been brought about. They had thought it a great thing to be able to diminish an operation by half an hour. As the result of Dr. Price's investigations those methods had been introduced into some of the largest works in Birmingham.

Mr. Stansbie said that the metallurgical department had been a little behind in this matter, but they were now trying to effect a useful co-operation between the metallurgical and the chemical departments. They had found it more difficult to deal with a complex solution than with a simple one, and some alloys were very impure, containing metals difficult to separate. They had had especial difficulty with German silver, and it had been practically impossible to obtain a hydrate or an oxide in a perfectly pure condition, and therefore to determine the precise composition of the German silver alloy. But they now hoped to get an accurate analysis. They had had a similar apparatus fitted up in the department, and they hoped to give the students in the higher stages the advantage of the work which Dr. Price had done.

Mr. Baker remarked that the importance of moving the cathode in the process of deposition had long been recognized, but the amount of motion given to the cathode had been very slight until recently. In a silver plating bath they had had a moveable frame which simply oscillated, and the articles ran from back to front along a kind of tramway. That was imperfect and rendered them liable to rough deposits, but the new methods had been adapted to silver plate baths with considerable success. In another case a bath was so arranged that the articles took a circuitous journey round the bath. There was a charging door and glass panes so that the operator could look through. The bundles of goods were hooked on to continuous cathodes, which traveled round the bath. An agitating solution had been adapted also to copper refining. One of the Birmingham firms, Messrs. Canning, has found that they could do twice the work with a rotating, as compared with a still bath. Still another apparatus had lately been introduced, having a kind of screw propeller which agitated the liquid and by this means they had treble the work done. The users were delighted with the result of this new apparatus. Many years ago he had himself introduced a meat jack. (Laughter.)

Dr. Price, replying, said he believed he was the first to introduce rotating arrangements into Birmingham, and several exhibitions of such apparatus had been given at the Midland Institute Conversazione. It was not quite correct to say that the propeller was of quite recent introduction, because Messrs. Rudge-Whitworth had used one for two or three years to do their nickel plating, and it did the work more quickly and much more satisfactorily than before.

BRASS PLATING BUCKLES.

By Charles H. Proctor.

The buckles, after leaving the foundry, should be pickled in a 5 per cent solution of hydrofluoric acid to remove the sand; this operation will require from ¼ to ½ hour. The buckles should then be removed, thoroughly washed in cold and boiling water, and dried out. The tongues and rollers should then be placed in position. The complete buckle should then be tumbled in a 5 per cent solution of sal soda water, and in one hour they should be sufficiently bright for plating. Frame up the work directly from the soda solution; this will avoid drying out, as the soda prevents rusting.

Pass the buckles through the potash and dilute muriatic acid dips in the usual manner and plate. After plating, the buckles should be thoroughly washed in boiling water to which has been added a small amount of cream of tartar—½ ounce to the gallon will be sufficient. Dry out directly from the tartar solution and then dry thoroughly with the aid of heat.

The buckles should then be finished by tumbling in leather meal for 5 minutes. A little powdered rouge mixed with wood alcohol should be sprinkled with the meal before the articles are placed in the barrel for finishing. The work is completed by lacquering.

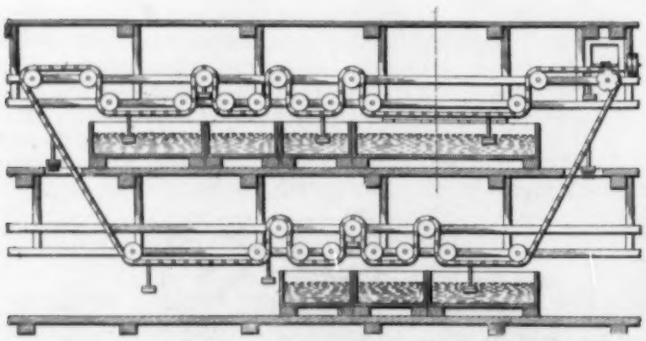
TO PRODUCE BLACK UPON ALUMINUM.

By Charles H. Proctor.

A good black can be produced upon aluminum by using the following formula, but it will be necessary to protect the coating by dip lacquering: First make a saturated solution of chloride of zinc by dissolving sheet zinc in muriatic acid for at least 24 hours, or until the acid is completely saturated with the metal. To this solution add 10 to 12 parts hot water, and to each gallon of solution so prepared add 1 ounce sulphate of copper and a few drops of clear muriatic acid. See that your castings are perfectly clean and immerse them in the solution for a few seconds, when the black oxide will form. Remove carefully, dry with the aid of heat and lacquer. The black is removed very easily, so the articles must be handled very nicely; but when lacquered it becomes permanent. We send you a sample of sheet aluminum oxidized in this manner.

ELECTROPLATING APPARATUS.

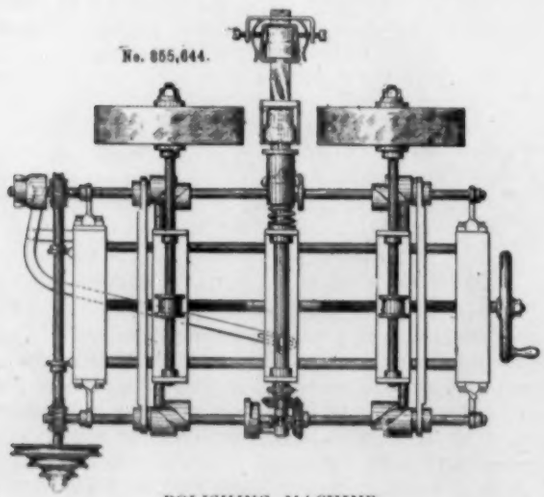
An invention by David F. Broderick, of New Britain, Conn., for which letters patents were issued June 25, 1907, has for its object the construction of an endless carrier for the work. The apparatus is so constructed and operated that the work can be started from a given point and made to return thereto, the work being immersed in the several baths during its travel. The carrier consists of an endless chain which passes over and around suitably disposed guide wheels, so as to deposit the work in the baths and lift it therefrom. Each carrier chain comprises two sets of links pivotally connected together, and the work is supported from the chain. The tanks are, of course, provided with anode plates as in the ordinary electroplating bath.



ELECTROPLATING APPARATUS.

POLISHING MACHINE.

The object of an invention for which letters patent were granted Ernst Kruger, of Berlin, Germany, June 4, 1907, is to provide a machine for automatically polishing round objects, especially round metal cases, in uninterrupted succession by means of several polishing disks. The chief feature of the machine is that the piece of work is automatically pushed by the feeder on a rotating

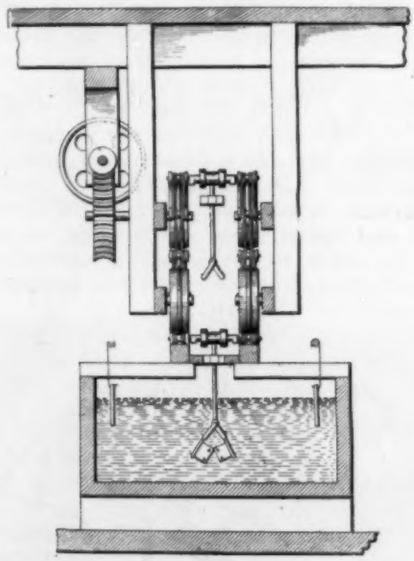


POLISHING MACHINE.

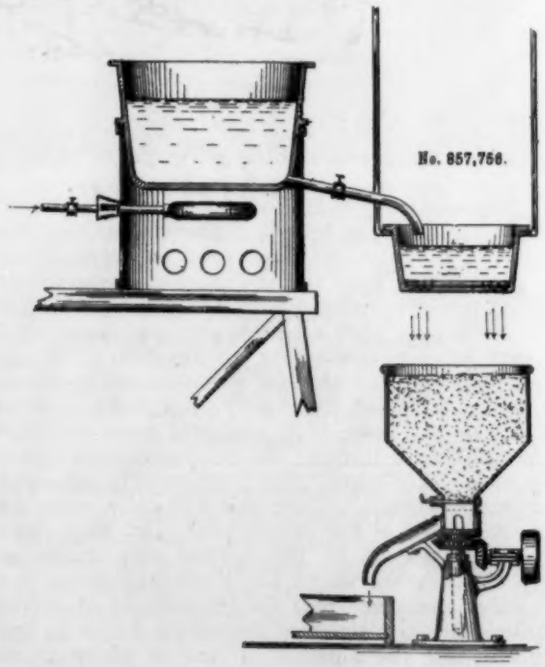
mandrel which is mounted between two or more polishing disks revolving at high speed and which is expanded or spread out by an automatically gripping device like a lathe chuck. The mandrel holds the work fast while it is being polished and until the gripping device is automatically loosened again and the finished object is thrown off by a pushing device.

METHOD OF MAKING SHOT.

A patent granted to Thomas E. Reddy, of Pittsburg, Pa., June 25, 1907, describes a new method of making shot. The molten lead is dropped from the bottom of a kettle into a moving body of plumbago, commercially known as "East India graphite." The lead is first tempered by arsenic and then melted and poured into the



perforated kettle from which it drops. The plumbago into which the lead drops is kept moving so that one shot will not fall upon another before sufficient time has elapsed to permit the metal to harden. In practice it



SHOT CASTING APPARATUS.

has been found that shot manufactured by this method do not flatten or explode when dropped into a mass of plumbago, but keep their spherical form.

ART JEWELRY IN BIRMINGHAM.

(From Our Birmingham Correspondent.)

No great progress seems to have been made with the municipal school projected for the education of brass workers. One reason seems to be that the public seems indisposed to pay fancy prices for hand brasswork of a really good class. They seem quite content with machine stuff produced from a common pattern, especially by means of the capstan lathe, and the artistic handicraftsman therefore seems to be more at a discount than he was.

The record of the Vittoria Street School for Jewelers continues to be one of progress. So far no definite stage has been reached with regard to Prof. Ashley's scheme of co-operation with the university and in certain quarters it is meeting with a little opposition from the section of the trade who think more of technical ability than business training. But it seems likely that the various negotiations will eventually bear fruit in a practical scheme.

HAMMERED AND SILVER INLAID WORK OF COPPER.

But an important development is likely as a result of the suggestion made by Mr. H. Wilson, the school examiner, who has recently issued his report in connection with the annual exhibition of work. Mr. Wilson considers the school should now be opened in the daytime and so turned into a training school for the production of practical workmen in all branches of the trade. At present the real jewelry workers come at night and only a few outsiders, who come purely to study art, are admitted during the daytime. Mr. Wilson points out that the pupils would come fresh to their tasks, thus furnishing the masters with better material to work upon, while the employers would benefit by the increased skill and adaptability of their assistants and workmen. It is suggested that classes should be provided for scholarship students and also classes for very elementary students selected from the most promising boys and girls in the ordinary elementary schools. In this way the nucleus of a graded school of real education by the practice of craftsmanship from its simplest to its highest forms would be provided and the ideal combination of manual and mental training would be completed by the further arrangement of a system of half-time training. The following summary by Mr. Wilson shows how highly he regards the work that has actually been done. He says:

"I would not for a moment have it supposed that the work of the school is in any way deficient. What has been done is wonderful. It is only because I see what might be that I have made this report less an actual criticism of the past than a constructive suggestion for the future. The promise of the past year has been well maintained; the practical application of new motives in enamel work to the decoration of boxes is most successful. The damascene work shows very great improvement, and the same must be said of the hammer work, the repousse and the engraving. Perhaps the most remarkable advance of the present year has been made in the class for die sinking; the work to which the prize has been awarded is in every way worthy of praise. The drawing from plants, living animals and from the life all mark new stages of development and are full of promise for the future and I foresee a very successful year for the whole school."

Of the exhibition itself some idea has already been given by the illustrated article dealing with the last exhibition published some months ago. It is only necessary to add to this the general observation that still higher artistic ability has been achieved this year, as indicated by the accompanying engravings. There are, at the present time, between 500 and 600 students whose average age is sixteen and some of the studies exhibited are the work of boys of thirteen and are really admirable examples of drawings from Nature. The primary principle always in view at this school is the necessity to faithfully copy Nature, and upon this attention is concentrated. The student is taught to note the delicate and beautiful curves and traceries and the rich coloring in Nature to reproduce them with pencil and brush and to apply them to the purpose of the ornamentation and adornment of the objects of his craft. The drawings show that the students have made their duty a delight and some superb examples are exhibited. The plants and flowers are a beautiful collection. The list of successes is headed in this branch by Alfred E. Bateman and William H. Blackstaffe, the former of whom produces a spray of ivy and a tulip and the latter a primrose plant in flower and a sprig of the orange tree bearing fruit. The students also have been remarkably successful in their studies of living birds and animals. Miss

Lydia Cooke, for example, has a clever drawing of a guinea fowl in which she has managed to convey the fineness of the texture of the birds' feathers. Four students, including in addition to Miss Cooke, Charles Thomas, Frank H. Gopsill and Howard F. Tonks, are bracketed together as equal for first prize. These students only had half an hour in which to execute the work.

There are some very dainty achievements in the drawing of butterflies.

Coming next to actual metal work, improvement is noted in the application of new motives in enamel work to the decoration of boxes, and a considerable improvement in damascene, hammer work, repousse and engraving. One of the finest examples is a couple of boxes, one decorated with enamel and the other with gold and silver by Bertram Hunt, a youth of nineteen. They are of delicate design and rich coloring. The youth has obtained first prize for box making and a national bronze medal. James Morris was awarded a national silver medal for a button. Other beautiful examples are a hot water jug by Lewis Instone, a kettle and stand elegant in design and clever in workmanship by Charles L. Allison, who won the first prize for raising and mounting combined. Other prize winners are W. G. Randall, who won a first for charmingly designed rings. Mr. Wilson, the examiner, laid stress upon the great improvement in die-sinking, and under this head a really wonderful piece of work is a head for a medallion by Charles Thomas. The school has obtained thirty-seven awards in the national competition in addition to the purely local prizes.

The prizes were distributed on the 1st inst. at a meeting presided over by Lionel Spiers, chairman of the Jewelers' and Silversmiths' Association and attended by the Right Hon. William Kenrick, chairman of the Museum and School of Art Committee; Councillor Murray; Prof. Turner; R. Catterson Smith, head of the Central Art School; A. J. Gaskin, head master of the school; F. Haseler; E. P. Hytch, secretary; W. J. Wainwright, the well-known artist, and others.

The chairman mentioned the significant fact that inquiries were constantly being made, interviews sought and information asked for, not only from America and the colonies, but from that Mecca of art industry, Paris, which was becoming not only interested but not a little envious of the freshness and spirit that were introduced in the teaching of the school.

Councillor Kenrick, the chairman of the City Education Committee, gave a most informing address, tracing the history of the jewelry industry. Mr. Kendrick considered that the besetting sin of the present day, as well as of the past twenty years, was the extravagant waste of valuable materials. It seemed to him that to use large quantities was really a great waste. In the case of large diamonds, if they were, instead of being heaped togther, half the number, half the size and disposed over twice the space, the effect would be very much better. Sufficient pains were not taken in the setting of precious stones and sufficient notice was not taken of their variety. They seemed to run on diamonds, rubies, pearls, and the only variation was pearls, diamonds, rubies. He was appalled at the labored hideousness of what he saw in the London shop windows. He had seen specimens of work in the Vittoria street school, which would do credit to the students and to Birmingham in whatever part of the world they might be sent to.

But the backbone of the Birmingham trade was cheap jewelry. That sounded bad, but when they remembered the number of people earning only about 23s. a week or a little more and knew that these people were just as anxious to have ornaments as duchesses were they would know that cheap jewelry must be provided. But it should be so made as to be just as creditable to Birmingham as the better class of jewelry and they must employ all the resources of science and every new invention in producing ornaments cheaply. Yet they must recollect that cheap jewelry need not be bad jewelry and they might have good artistic work that was cheap just as they had that which was dear. He hoped they would always turn out splendid work and that it would broaden until everything that went from Birmingham went not because it was so cheap but because it was so good.

The address was highly appreciated, arousing frequent applause, and a hearty vote of thanks was accorded at the close.

The exhibition was very popular and during the week it remained open was visited by thousands of people.

ART METAL WORK IN COPPER.

TIN IN BOLIVIA.

The exportation of tin from Bolivia for the year 1906 was 638,486 quintals of 60 per cent. tin, that being the entire quantity produced. The average price of Straits tin, the basis of value in Europe for the year 1906, was £179 12s. per ton of 1,000 kilos of pure tin ($871.38 per metric ton of 2,204.6 pounds), which corresponds to that of Bolivia of 60 per cent. pure tin £108 ($25.58), which, with the average rate of exchange of 1906 of 19½ pence (39 cents) per boliviano, and deducting the commissions, etc., in Europe, give a net result of 1.2 bolivianos per kilo (about 21¼ cents per pound), a very remunerative price for the producers of Bolivia. The production for the year 1905 was 601,948 quintals, with a commercial value of 26,205,141 bolivianos. The production for 1906 had a commercial value of 35,244,444 bolivianos, showing a large increase.

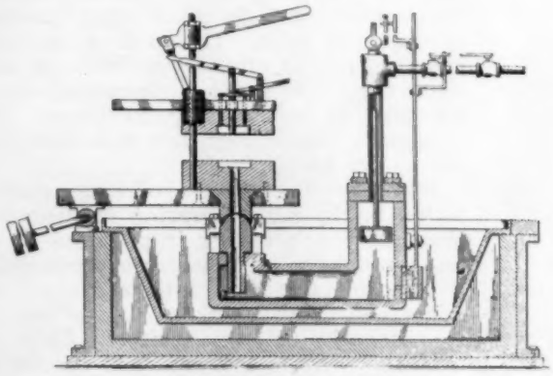
According to statistics the imports of lead into Great Britain during May totalled 17,300 tons, making 81,985 tons for the present year, compared with 85,632 tons in 1906. The exports were 6,054 tons for May and 27,707 tons for the year.

INDUSTRIAL

NEW AND USEFUL DEVICES, MACHINERY AND SUPPLIES OF INTEREST TO THE NON-FERROUS METAL INDUSTRY.

CASTING APPARATUS.

An invention of Herman H. Doehler, of New York City, for which patents were granted June 11, 1907, provides an apparatus in which deterioration of the metal within the pressure pot through oxidation or agitation from the air admitted under pressure is reduced to a minimum. In addition the air jet is admitted in such a manner that there is no spraying or cooling of the metal.



CASTING APPARATUS.

This is accomplished by an air shield interposed between the molten metal and the air inlet. The melting pot, pressure pot and mold holder are so constructed and arranged relatively to each other as to cause the holder and the pressure pot to be drawn together in closing the mold, thus avoiding a likelihood of a void being formed between the discharge nozzle of the pressure pot and the co-operating nozzle of the mold holder.

THE WILSON-MAEULEN PYROMETER.

The exact regulation of temperatures by pyrometers in manufacturing processes is realized by most works superintendents as being important. The advantages derived by careful temperature regulation are: Uniformity of product and the saving of time and money.

The tool steel man knows that each particular steel has a certain temperature at which it should be treated for a definite length of time for hardening. Those using low temperatures and wishing exact results use salt baths, say up to a temperature of 1500° F.; those using high speed steels, which require a temperature of about 2370° F. use muffle furnaces, or crucible furnaces, with simply empty crucibles. To tell temperatures by eye at even the low red heats is difficult, and at a white (2400° F.) is practically impossible.

The brass and iron foundryman knows that if his metal is poured either too hot or too cold bad castings will result. For every alloy and metal there is a certain temperature which will produce the best results. Find out this temperature and maintain it and one has constantly good results.

The power plant engineer saves coal by running according to his flue temperature indicator. He also pays attention to his feed water temperature. The galvanizing foreman, to do quick and good work, needs to keep his molten zinc at as nearly a uniform temperature as possible. Annealing of wire, assaying, chemistry and the hundred and one occupations requiring heat should all be regulated by the use of pyrometers.

FIG. 1—FACE VIEW OF SCALE.

We illustrate herewith a practical works pyrometer, inexpensive, strong and elastic in application. Its large open scale may be easily read from a distance of 12 feet. It may be placed 75 or more feet from the source of heat which is being indicated. It is built in several ranges. The part which extends into the heated area is called the fire-rod. This is strong and cannot be broken. It consists of a pipe with an inside asbestos insulated rod. The junction, which is here illustrated, extends into the fire. The free ends are connected by copper wires with the indicator, which is simply a milli-voltmeter. As the junction is heated a slight electric current

a—Thermo-junction; d—Iron tube; c—Alloy rod; k—Asbestos insulation.

FIG. 2—LONGITUDINAL SECTION OF FIRE ROD.

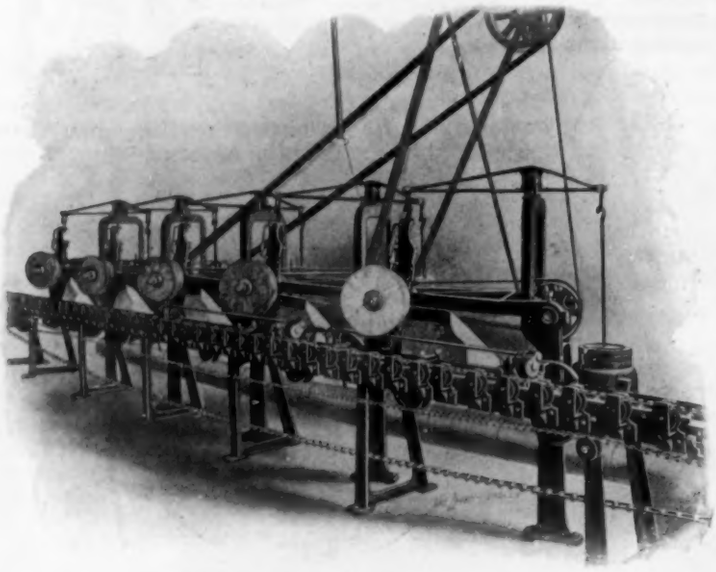
is formed, which the milli-voltmeter measures and indicates. Every fraction of a volt increase in current means so many degrees increase in temperature; so the indicator is graduated direct in degrees Fahrenheit or Centigrade. As many fire-rods as one may desire can be stalled, any one of which may be instantly connected with the indicator by means of a switch; thus in a second the foreman can tell the temperature of any one of a dozen annealing furnaces or zinc pots or flues.

For the superintendent a recorder is best. This he can have in his office, several hundred feet from the furnace. A glance at the record paper tells him how his men are firing at any moment and how they have been firing during the night. The record paper feeds out at the rate of two and three-eighths inches per hour. Thus one can tell the temperature for any minute either for the previous night or for months back.

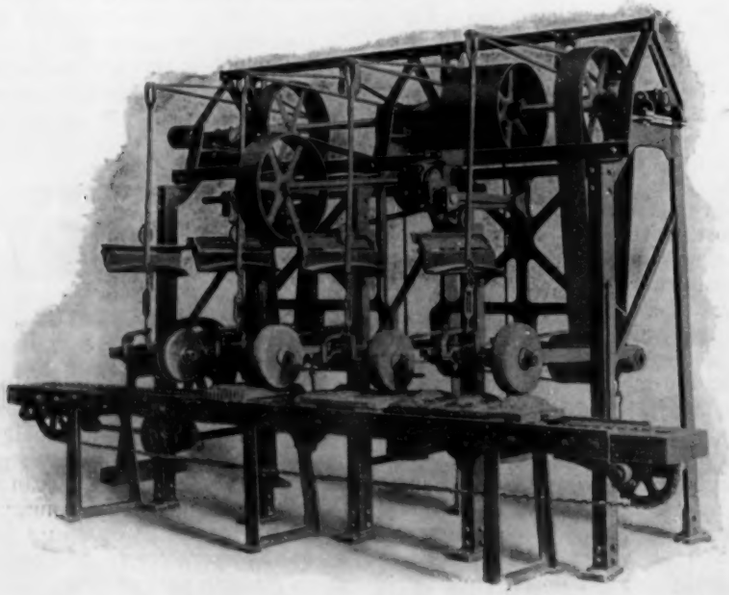
These instruments are being put on the market by Wilson-Maeulen Co., 110 Liberty street, New York City.

AUTOMATIC POLISHING.

Machinery for automatic polishing is attracting considerable attention at the present time in all metal working shops and THE METAL INDUSTRY has, within the last few years, published considerable on what has been accomplished along this line. In our issue for March, 1906, we showed one of the machines of the Robinson Automatic Machine Company, Detroit, Mich. At the convention of the American Brass Founders' Association an interesting paper was presented on the subject of automatic polishing which pointed the benefits to be derived from the process, both financially and in the health of buffers and polishers.



AUTOMATIC TUBE POLISHING MACHINE.



FOUR-WHEEL AUTOMATIC POLISHING MACHINE.

The Robinson Automatic Machine Company have had considerable experience in building machinery suitable for this work, for their business connections are of such a nature that they have been called upon to design and build appliances for a large manufacturer of metal goods. We herewith present two types of their machines which have been in successful operation for some time. We believe every manufacturer of polished metal work will be interested in learning what has been accomplished so far with machinery which reduces the number of polishers.

Their automatic tube polishing machine is available for polishing or buffing iron or brass tubing, and produces finished work from the rough in one pass through. The 5-wheel machine has a capacity of 2,500 feet per day and can be adapted to work of any diameter from two to eight feet in length. Every inch of the surface is polished as the tube revolves in its holders and is simultaneously moved in a horizontal direction beneath all the wheels of the machine at an agle of 30 degrees, the same as with hand work. The machine can be operated by belt or other transmission or direct connection. The speed of the carriage can be regulated to suit varying conditions. This machine is made in four sizes with three, four, five or six wheels.

With the automatic polishing machine shown in the next engraving finished work from the rough casting is produced at one pass through the machine. It is conservatively estimated that one of these 8-wheel machines will do the work of twelve polishers and produce absolutely uniform surfaces. Only one machine is required to place the work and operate the machine. A set of follow boards or carriages for the work to be polished can be made by any ordinary carpenter at a trifling cost.

The machine is made in two sizes. The 8-wheel machine requires fifteen horsepower to operate and the 4-wheel eight horsepower. It can be operated by belt or direct connection. The speed of the carriage can be easily regulated.

Both of these machines are sent out and erected under the personal supervision of expert operators, who remain in charge until the entire equipment is in perfect working order.

AJAX GRAPPLE HOOK.

The Ajax Grapple Hook Company, 136 Liberty street, New York, are sole manufacturers of the Ajax grapple hook here illustrated, a simple, inexpensive device for holding boiler plates or other metal sheets while being punched or otherwise worked or carried from place to place.

AJAX GRAPPLE HOOK.

It consists of an outer burden-bearing hook, an inner holding hook, an actuating lever and a cotter pin

shackle. As the cut clearly shows, the inner hook travels up and down on the flange of the outer hook, actuated by the lever, which is of such length as provides a handle for quickly releasing or engaging the plate as well as guiding same while being punched or otherwise worked. As a safety time-saving device it will no doubt commend itself strongly to boiler and tank makers, locomotive builders, contractors and manufacturers in general, with whom it has already found high favor among all who have tried it.

SHEET METAL MACHINES.

(Continued from former issue.)

The screw machine, Figure 8, is used for rolling threads on caps or shells such as catsup tops, harness oil can tops, pepper and salt tops and brass lamp collars. The machine shown is especially intended for zinc fruit jar

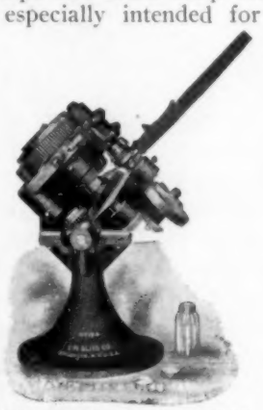


FIG. 8—SCREW MACHINE.

tops, and is entirely automatic in its action, all that is required of the operator being to keep the chute full of the articles to be threaded.

Attention might also be drawn to the foot and screw power presses. These machines are used by manufacturers who do not have available power in their factory. They are built in many styles and sizes and have a wide range of usefulness. Some of the screw presses are made exceedingly heavy, and are capable of exerting enor-

FIG. 9—FOOT PRESS.

FIG. 10—SCREW PRESS.

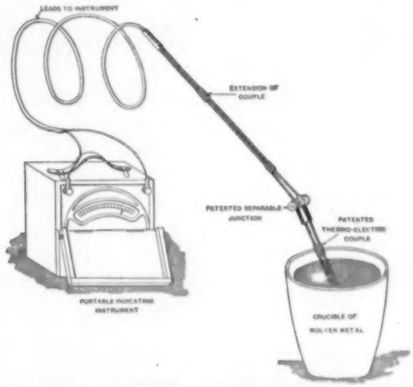
mous pressure. Figure 9 shows a type of foot press, and Figure 10 shows a screw press.

In addition to the machines mentioned, a large number of other tools are used for the manufacture of sheet metal products. Some of the more important ones are wire handle and wire ring machines, body forming machines, trimming and beading machines, notching machines, crimping machines, solder moulds and solder cutters, soldering machines and many others. These machines are built by the E. W. Bliss Company, Brooklyn, N. Y.

A PORTABLE PYROMETER FOR INSTANTANEOUSLY TAKING TEMPERATURES FOR MOLTEN METALS.

In manufacturing processes and in metallurgical work molten metals and alloys are extensively employed, especially for the making of castings in which it is of the utmost importance that the metals be mixed, alloyed and poured at the proper temperature in order to obtain the best results. The special form of pyrometer described here has been designed to meet the practical requirements of every-day shop practice. The portable indicating instrument may be carried in the hand and within two or three seconds the temperature of the molten metal may be taken. The possibilities and great value of an instrument of this kind will be fully appreciated by those who are interested in foundry work of any description.

The outfit complete consists of a portable indicating instrument connected to a special thermo-electric couple, the two elements of which are disconnected and left with-



PORTABLE PYROMETER FOR INSTANTANEOUSLY TAKING TEMPERATURE MOLTEN METALS.

out insulation. When the tips of these elements are slightly immersed into the molten metal an electric connection is made and the reading on the instrument will be the same as if the couple had been originally joined.

The general arrangement of the parts forming the outfit for this class of temperature measurements is shown in the accompanying diagram as it would be applied for taking the temperature of a crucible of molten metal just before pouring.

The advantage of this plan is that the tips of the wires forming the elements almost instantaneously assume the temperature of the molten metal and time lag error is eliminated. This form of couple has been most successfully applied to the measurement of such molten metals as cast iron, copper, aluminum, brass, bronze and other alloys.

When the tip of the couple becomes worn away by continued use, a fresh portion is exposed to the molten metal, and the reading will be the same as if the couple had not been reduced. A separable junction is provided, as shown in the diagram, so that fresh tips can be conveniently applied before enough of the couple has worn away to appreciably affect the resistance and cause an erroneous indication on the instrument.

These instruments are being successfully used by a large number of manufacturers. They are manufactured by Wm. H. Bristol, 45 Vesey street, New York City.

The United States makes the best offer to the Mexican trade in rolled gold chains, pins, buttons, etc., but in solid gold articles Germany makes better prices and at the present time has almost the entire trade in this line in Monterey. The same holds true in diamond rings and diamond settings generally. Germany is also doing the greater part of the business in solid silverware.

EDITORIAL

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THE PROTECTION OF MANUFACTURING SECRETS.

On July 2 the Court of Errors and Appeals of New Jersey handed down a decision of vital interest to all manufacturers who employ processes in any degree in the nature of a secret. The decision was in the case of the Vulcan Detinning Company against the American Can Company. The litigation has occupied a number of years and was caused by the use by the American Company of a process of recovering tin from scrap which the Vulcan Detinning Company claimed to own.

The Vulcan Company made use of a chemical and electrical secret process which they had purchased in Holland several years ago. This process was not protected by patent or otherwise—it was simply a method of doing the work which was handed from one to the other, but about which other manufacturers along similar lines were not supposed to be conversant. In this respect it very closely resembled the secret methods of Bessemer in the production of bronze powders and also the methods now pursued by the manufacturers of wool made of lead, zinc, and the like. In reviewing this decision it must be borne constantly in mind that the process, no matter what it was, was under the exclusive control of the Vulcan Company, and was not to be used without their consent.

The Vulcan Company was organized here about ten years ago, and they purchased all the scrap tin of the American Can Company until the latter company began to use the process. But the business relations of the two companies did not constitute the principal point in the suit and figures only very mildly in the decision.

Some time after the Vulcan Company began business the American Company installed a detinning plant and employed two former superintendents of the Vulcan Company, and also another employe who had become thoroughly acquainted with the methods followed by the Vulcan Company. Testimony was taken in this country and also in Holland and Germany and as the first case in the lower courts went against the Vulcan Company they appealed and carried it to the highest tribunal in the State.

The decision holds that former employes of the Vulcan Company, who learned of the secret process in confidence, became trustees of the secret, and assumed all the obligations and responsibilities of such a position. The court carries this still further and declares that when the American Company employed men who had a knowledge of the secret it became responsible for the secret, and in fact became the custodian of the secret of its rival. And since a trustee cannot acquire an outstanding title against his principal, the American Can Company cannot set up a title to a process which it claims to have purchased. The court holds that if it did this it would hold

the process only for the benefit of the other company.

By this decision the American Can Company is permanently enjoined from the use of this detinning process and it is ordered to account to the rival company for all the profits it has made out of the detinning plants up to the present time.

The case will undoubtedly be taken to the Supreme Court of the United States and if that tribunal should uphold the decision of the New Jersey court, it is not difficult to foresee the result. An acquired process or method, obtained by any one and used by him in his establishment, will belong to him exclusively, and any one who acquires knowledge of the process will be called upon to guard the process, since when he receives knowledge of the process he becomes its guardian in the office of trustee. In this sense he must guard the process for the benefit of the owner, and if he imparts it to another, then the second becomes a trustee likewise. Legally the trustees would then be responsible for a method, in which, perhaps, they had no interest whatever. As we have said, the decision establishes a precedent and if sustained the effect will be widespread.

The ethical aspect of the case does come within our province. Engaging the services of men acquainted with the details of your rival's business in order that you may profit thereby is so common in these days as to attract but little attention; the concern doing acts of this kind is only thought to be progressive and quite energetic.

SUMMER EQUIPMENT.

"In Times of Peace Prepare for War" is a time-honored, though a time-worn expression and so far as the metallurgical industries are concerned might be turned into the phrase "In Times of Summer Dullness Prepare for the Winter Rush."

While this is not a new maxim to large manufacturing concerns which make a yearly practice of overhauling their factories, the same attention is not always given or we might say even rarely given by the smaller concerns who look forward to the day that they will be big. Many of these smaller firms, however, forget the prime factor that the large plants have become large through their systematic improvements. At each period of summer dullness they have studied their needs, ordered equipment accordingly and are therefore always in a position to satisfy the demands of not only their regular customers, but of the possible new ones. It is for the smaller concerns who do not follow this system to wake up during the lazy summer weather, look over their stock and machinery and see whether they can replace an out-of-date machine with one that will do the work or get rid of some old material which can be replaced with new to advantage.

There is no better basis for finding out what the manufacturers have to offer in the way of equipment than by watching what machinery, metals and supplies are being advertised. The manufacturer who is alive recognizes the necessity of continually keeping his products before the industries that he sells, thereby creating for himself a name, standing and good will which he can get in no other way, besides explaining the merits of his metals, machinery and supplies. Therefore, by referring to the advertisements of a good trade journal the manufacturer may see many new appliances which would be valuable for his shop and also the names of many firms with whom it would pay him to do business. If he wishes to grow, and most all do, it is his duty to prepare during the dull summer months for the busier trade which is bound to come with the change of seasons.

THE NEW ROLLING MILLS OF 1907.

Another new rolling mill begins to produce metal this month—the National Brass & Copper Tube Company, Hastings-on-the-Hudson, N. Y. This is the third new mill to begin operations this year, the others being as noted in the April number of THE METAL INDUSTRY the Waterbury Rolling Mills (incorporated) and the Pilling Brass Company, both of Waterbury, Conn.

The Hastings mill is connected in its management with the National Conduit & Cable Company of New York, and it is understood to have the best machinery obtainable for the drawing of brass and copper tubes. The mill has been built under the supervision of Charles S. Morse, a rolling mill man of long experience. The company will manufacture tubing for the general market.

It was expected that the mill of the Michigan Copper & Brass Company, Detroit, Mich., would start in July, which would make the fourth new mill to produce metal in 1907. With these new plants in operation and the improvements which have been steadily made in the old mills it would seem as if enough sheet, rod, wire and tubing might be produced within the next year or two to satisfy the needs of consumers.

NOTES.

According to the reports of Consul William H. H. Webster, of Niagara Falls, Canada, the production of artificial graphite last year amounted to 454,311 pounds, the greater part of which was exported to the United States. The graphite is manufactured from anthracite coal and petroleum coke in the electric furnace.

During the first three months of the present year Australasia mined 918,735 ounces of fine gold, as compared with 996,644 ounces during the same period last year. The decrease was a general one throughout all the mining districts.

Last year the mines operated by the Treasury Department of the Russian Government produced 15,072 ounces of gold from the Tomsk district and 12,984 ounces from the Siberian steppe mining district. This was an increase of 2,068 ounces over the production of 1905.

The Muho and Kuanying Shan gold mines, which have been restored to China by Russia on the repayment of the expenses incurred by the latter during the last few years, are said to be still very rich, and may be again made prosperous if sufficient funds are put into the working of them.

CRITICISM AND COMMENT
WE CORDIALLY INVITE READERS' OPINIONS AND CRITICISMS OF ALL ARTICLES PUBLISHED IN THE METAL INDUSTRY. SUGGESTIONS WELCOME.

SPOTTING OUT.

To the Editor of THE METAL INDUSTRY:

I have noticed for some time that many of your readers are troubled with spotting out and that they are having more or less difficulty in overcoming the defect. In cast work it will be observed that the spotting out is not distributed evenly over the entire surface but is confined to one particular place. A careful examination will show that the spotting is mostly where the gate is placed, and by using a strong glass, after removing the copper deposit by acid dipping, this particular place will be found to be full of holes on both the finished and unfinished sides of the casting.

The trouble is the solution gets in and the problem is to get it out. The most successful method and the one that is always sure is to wash and dry the articles thoroughly and then let them remain unfinished for several days or a week. In the end the spotting will have been accomplished. Then pass them through a slow acting bright dip, wash and finish in the usual manner. The spotting will not occur again. Of course it is necessary to perform the dipping very rapidly unless you have a heavy deposit.

Another method is to boil the articles out in water to which has been added ½ ounce oil of vitriol to each gallon for 15 minutes. Dry out and finish in the usual manner. Then rig up a bath of lacquer thinner, used quite warm, and before lacquering immerse in the hot thinner; allow to cool and finally lacquer in the ordinary way. This method has proved very satisfactory on all classes of plated goods. C. H. P.

NEW BOOKS.

AMERICAN PATTERN SHOP PRACTICE. By H. J. McCaslin, 6¼ by 9¼; very completely illustrated. Published by The Frontier Company, Cleveland, O.

The book is divided into sections, the first dealing with engine patterns, including cylinders of several kinds and engine beds. The next section is upon molding and cores and opens with multiple core molding, which consists in the grouping together of a number of cores containing impressions of the object to be cast, and so arranged that they can all be poured from one gate. Excellent examples are presented of core box work, which is regarded as one of the most intricate and important parts of pattern making. The third section considers sweep work, the next gearing, and the fifth representative patterns, the latter dealing with trottle valve body, pinion housing, hawser pipe patterns, nozzle pattern, cylindrical castings, crooked elbows, truck bolsters. The final section contains hints, suggestions and rigs. No set rules can be laid down for the pattern maker; the subject varies too greatly in design, and the conditions to be met are too widely different. Each particular object must be treated individually, and perhaps new methods must be devised to overcome new difficulties. The author does not, therefore, claim to have solved all the problems arising in pattern making; but he has succeeded in presenting in exceedingly plain form a wide range of suggestions or examples which must surely be of the greatest benefit to those engaged in this work. The author has made profuse use of illustrations and the drawings are all remarkably clear and well chosen to illustrate the matter.

DUTY ON COMPOSITE IRON-NICKEL SHEETS.

Composite sheets of nickel and iron rolled down from an article made by welding a sheet of nickel on an iron plate three-eighths of an inch thick are not considered by the Board of Appraisers as being common or black iron or steel sheets; they are not coated sheets, welding not being coating. Such plates were decided to be dutiable at the rate of 45 per cent ad valorem.

NOTES.

A new solder has made its appearance in Germany. It is composed of lead and tin in the form of an impalpable powder, which is mixed with chloride of zinc and made fluid with glycerine or vaseline. This paste is spread over the surface or joint to be soldered and heat applied. The metal melts and appears within the paste in globules. No oxidation takes place and the joint is very clean. The solder has been named "Tinol."

Consul-General W. H. Michael, of Calcutta, states that a company composed of Europeans of standing and well-known natives has been formed for the purpose of working the Kashmir sapphire mines and the gold-bearing gravel in the Dras River in Baltistan. The company will be known as the Kashmir Mineral Company.

Charles H. Birmingham, of Baltimore, Md., has patented the following alloy as a substitute for platinum: Silver, 16½ ounces; nickel, 4⅓ pounds; bismuth, ½ ounce, and gold, 53 pennyweights. The inventor claims that this alloy can be used as the leading in wires for incandescent lamps, contact points for electric vibrators and in all classes of electrical appliances where high resistance is required.

Consular reports state that the price of diamonds has been controlled for some years by a powerful syndicate of diamond merchants in London. No difficulty has been found in maintaining the price and the value per karat has been steadily rising. The value per karat of the diamonds recovered from the principal producing mines according to their latest report is: De Beers and Kimberley, $12.68; Wesselton, $8.86; Bultfontein, $8.38; Dutoitspan, $16.78; Jagersfontein, $13.86, and Premier, $5.64.

After July 1 all articles that can be classified as plate and all watch cases imported into the United Kingdom must be hall-marked to show their fineness. This ruling does not apply to articles imported prior to July, since it was not desirable to impose a hardship upon holders of stocks of foreign watches.

CORRESPONDENCE

IN THIS DEPARTMENT WE WILL ANSWER QUESTIONS RELATING TO THE NON-FERROUS METALS AND ALLOYS. ADDRESS THE METAL INDUSTRY, 61 BEEKMAN STREET, NEW YORK.

METALLURGICAL.

Q.—We have on hand about 500 pounds of broken nickel anodes and usually have that much annually. Is it possible to melt these anodes and run the metal off into molds to be used over again? If so is it necessary to have them annealed as they come out of the molds?

A.—You can produce very satisfactory nickel anodes from your scrap by adding about 2 pounds of Straits tin to each 100 pounds of nickel. It is not necessary to anneal after casting. Proceed as follows: Prepare a wooden pattern of the desired shape of anode and make a sand mold in the ordinary way. Use a graphite crucible for melting and for a flux use borax or fluor spar and lime mixed in the proportion of 1 part of the former to 2 of the latter. When the proper temperature is reached add the tin and mix thoroughly, using, if possible, a graphite stirring rod. The success of nickel anode casting is in obtaining the right temperature.

Q.—Kindly advise the writer what kind of metal is used in making what is known as Victor metal, and how it may be cast into molds.

A.—You probably refer to Victor manganese bronze, which is one of the strong bronzes and is made of copper and zinc with small amounts of iron, aluminum, tin and manganese. It may be cast like brass, but has a high shrinkage. It is applicable to the making of propeller blades, automobile castings, etc.—J. L. J.

Q.—Will you please give me the formula for mixing brass steam valve metal?

A.—The following mixture is intended for valve bodies; copper 85, tin 5, zinc 5, lead 5. If the mixture is wanted for stems mix as follows: Copper 88, tin 10, and zinc 2.—J. L. J.

Q.—I would like a formula for manganese bronze; also please state the best method of introducing the iron into the mixture.

A.—It is best to obtain the manganese bronze in ingot form from some reliable maker. But if you wish to experiment in introducing iron in this bronze, take some clean galvanizer's dross and cut it down with Bertha zinc until it contains 1½ per cent. of iron. Then add 1 per cent. of aluminum and pour into slabs. Melt 55 pounds of copper and add 45 pounds of the aluminized zinc prepared as above. Manganese bronze has very little or no manganese in it.—J. L. J.

Q.—Can you give us any information in regard to the average amount of coal required to melt brass, bronze, etc., the loss in melting and the incidental expenses pertaining to the casting shop?

A.—The average amount of coal and coke required in melting brass depends on the furnace. A furnace with proper draft and of the right size, so as not to have too much waste space inside, will melt, on an average, 250 pounds of metal with 100 pounds of Connellsville coal and 72 pounds of coke. 175 pounds of metal can be melted with 100 pounds of soft coke and 200 pounds of metal can be melted with 100 pounds of hard coal. The loss in melting depends very largely on the mixture. With yellow brass mixture, properly handled, the loss will run from 2 to 3 per cent. in casting shop work.—W. J. R.

Q.—Can you give me any information as to the method of increasing the strength of aluminum castings?

A.—We do not know of any generally applicable method of increasing the strength of aluminum castings. It is possible that careful manipulation may slightly affect the tensile strength, but as a rule any variation growing out of this would be very slight. Water-cooled molds or metal molds might gain the desired results, but the use of these is so limited that they need not be considered.—J. R. J.

Q.—We frequently have inquiries for lead sash weights of various sizes and would be greatly indebted to you if you could give us some information as to the best methods or molds used by manufacturers of this article. If possible you might enclose a sketch of such molds that are used at the present time.

A.—The use of lead sash weights is increasing in the East and at the present time the Western trade leads in the manufacture of them. There are all sorts of molds used for casting sash weights, depending entirely on the size (weights) and shape best suited to the purchaser. Mrs. J. P. Fanning, 678 Jefferson avenue, Brooklyn, N. Y., makes these molds. An illustration and description of her work was published in the April, 1907, issue of THE METAL INDUSTRY.

PLATING AND FINISHING.

Q.—(1) Through your journal will you kindly give me the process of applying pigments for verde antique? And also (2) a blue color on steel by electro-plating?

A.—(1) For a full description for producing the verde antique by the pigment method see article by Charles H. Proctor entitled "Verde Antique on the Soft Metal Alloys," in THE METAL INDUSTRY for January, 1905. (2) A successful blue color cannot be obtained upon steel by electro-plating. The usual method for this purpose is to melt saltpeter in an iron pot; then immerse the previously polished and cleaned articles until sufficiently blued; remove and cool at once in paraffine oil and afterward dry out in sawdust. A method that you might try is to saturate muriatic acid with iron, using equal parts of acid and water. Use this as a plating solution and rig up so that the articles will be between two anodes. Reverse the poles, making the articles the anodes and apply a weak current. Use iron or nickel for the cathodes.

Q.—Will you tell me how the platonic colors are produced on statuary work?

A.—The definition of the word "platonic" means pure, and it also relates to Plato, the Greek philosopher. So the word can imply nothing so far as the finish goes. The platonic colors as applied to statuary may be of any combination that would apply to the dress of early Greek history. These are applied usually with French bronze colors and French varnish mixtures. Our advertising columns will give you the makers of these.

Q.—My nickel solution is very cloudy and a lot of froth forms on the top when working. I have filtered it, but to no advantage.

A.—Look first to your anodes and see if they are clean. It may be necessary to boil them and scrape them to get a good metal surface. Your solution is evidently not getting sufficient metal to feed it. If this does not improve it reduce your solution to 5 degrees and then add 2 ozs. single sulphate of nickel to each gallon of solution in use and 1 oz. of common salt. The solution removed from the tank may be added again as occasion requires. It is well to use barrels coated with asphaltum to hold the solution until needed.

Q.—(1) The man we had came from the Edwards Electric Chandelier Company of Chicago. The green he made worked on copper plated ware and it turned green in five minutes after it was put on with a brush. (2) I would like to have a good black nickel solution—one that contains copper, nickel, cyanide and arsenic. This solution is used for relieving purposes.

A.—(1) We are unable to give you the formula for the Pompeian green desired. It appears to us to consist of Paris green, acetic acid, sal ammoniac, chloride of zinc and water. You might try combinations of these chemicals. (2) For a black nickel solution such as you describe try the following:

Carbonate of copper	2 ozs.
Carbonate of zinc	1 "
Sal ammoniac	2 "
Arsenic, 2 ozs.; previously dissolved in 4 ozs. caustic soda in hot water.	
Sulphate of nickel	2 "
Cyanide of potassium	12 "
Water	2 gals.

To prepare this dissolve the copper and zinc in part of the water and 6 ozs. of the cyanide; add the nickel to the arsenic-soda solution by first dissolving in a little hot water. Mix and add the balance of the cyanide, with the sal ammoniac added last. Use anodes of sheet brass. Small quantities of ammonia added will produce good results.

Q.—(1) We would like a good soldering solution made without muriatic acid. (2) We would also like to know how to make a bright dip for copper shells, something that will not affect the solder. (3) We also want a bright dip that will leave no stains.

A.—(1) You might try the following formula in place of muriatic acid: Lactic acid 1½ parts, glycerine 1½ parts and water 12 parts, by weight. This liquid is non-corrosive and the fumes are not injurious. (2) It is not possible to produce a bright dip for copper shells that will not blacken the solder. It would be advisable to first dip the shells and then solder afterwards, using soldering fluid mentioned above. This method will leave your solder bright. (3) A good bright dip should consist of

Aqua fortis, 38 per cent	1 gal.
Oil of vitriol, 66 per cent	1 "
Rock salt	6 ozs.
Water	2 qts.

The acid should be mixed some time before using and should be allowed to cool.

Q.—(1) I am going to make a new nickel solution, 175 gallons, and do not want to use distilled water on account of the cost. Will city water do? (2) How thin can an anode be used before being sold for scrap? (3) I have no means of keeping my solution warm and crystals form on the anodes. I put a large dishpan (enameled) full of solution on the stove and heat it; this is then put back into the tank; the crystals then disappear.

A.—(1) The old theory that distilled water must be used for plating baths is erroneous. The slight impurity in most water is not detrimental to plating operations, so you can safely use city water in your bath. (2) Nickel anodes can be used as long as they will hold together. When they fall apart the pieces can be connected together with iron wire and give good results. Do not use any wire except iron; copper or brass will discolor your deposit, while iron wire improves it. (3) Your method is satisfactory, as long as you have no other means of keeping your bath at the right temperature.

Q.—Enclosed you will find a machine name plate. Will you tell me how it was made?

A.—The sample you submit is a very fine example of an etched name plate. We are of the opinion that the plate was etched in sheets and cut to size afterward. The etching is accomplished electrically by using a 2 or 3 per cent. solution of nitric acid, using the sheet to be etched as the anode, and a thin sheet of aluminum of like dimensions for the cathode. After etching, the stopping off varnish should be removed and the surface cleaned and slightly coppered in a cyanide of copper bath. It is then oxidized in a cold solution of liver of sulphur and water, 1 ounce to the gallon, and a few drops of water ammonia. It is afterward dried, scratched, brushed and lacquered with a hard transparent dip lacquer. When thoroughly dry remove the lacquer and oxidization with very fine emery paper. Then relacquer. We should be very glad to hear what results you reach from these suggestions.

Q.—(1) I would like to know how to produce the so-called "mahogany" finish, a sample of which I send you. (2) I would also like to know what you would suggest for spotting out plated work. We plate cast iron and cold rolled steel and have trouble with our brush brass finish, which is done by hand with pumice and water. I have tried boiling the work in a solution of whale oil soap for 15 minutes, also in a solution of commercial cream of tartar, and have also left it for half a day in an oven at 125 degrees before lacquering, but the work would spot out just the same.

A.—(1) This is not mahogany finish, but the Royal red or Royal copper. Its production consists of copper plating after polishing and cleaning, first in the cyanide bath for a few minutes and then in the acid copper for at least ½ to ¾ of an hour. Afterward pass through a bright dip to bring up the ground work. Re-color on a soft wheel. Then prepare a solution of acetate of lead in caustic potash, 2 ounces of the former to 4 ounces of the latter in each gallon of water. Use a lead plate for the anode and a weak current. Cleanse the work in the usual manner and flash in the lead bath for a second or two only. Remove and dry out. Then prepare the usual molten saltpeter bath in an iron kettle and immerse in this for a few seconds. Remove and cool in paraffine oil to bring up the color. Polish with canton flannel buff, using dry rouge and wood alcohol. (2) The most successful method of removing solution stains is to allow the work to lay around for several days, until the spotting out is completed, and then, before the final finishing, pass through a slow acting bright dip just sufficient to bring up the color and remove the stains. Another method is to immerse in a hot lacquer thinner heated by steam, or a hot water bath for a few minutes before lacquering and afterwards lacquering in the regular manner.

Q.—I am having trouble coloring Roman bracelets that are soldered with soft solder. They seem to color with the first two coats of fine gold, but when I tone them up the last time is where my trouble comes. They turn black around the joints and catches. They will not allow me to use copper on them as they are 1/10 plate and 14 karat gold.

A.—The only way we can suggest, if you are unable to coat the soft solder by coppering, is to dissolve sulphate of copper in boiling water to produce a saturated solution; then add a few drops of oil of vitriol. Cleanse your solder by scratch brushing it. Then apply a little of the solution with a camel's hair pencil brush and touch the spot with a piece of bright iron wire; this will give you a coat of copper on the solder and may help you out of your trouble.

Q.—Is there any way to cheaply gild aluminum hairpins similar to fire plating cheap jewelry? I have seen German thimbles gilt in a cheap manner and it seems to me what they do should be possible for us here.

A.—We do not believe there is any process by which this can be done satisfactorily. There are several methods by which a yellowish cast can be given to aluminum, but in no case de we believe they are at all permanent. In addition they have the objection of creating galvanic action between the aluminum and the coating, which eventually results in the corrosion of the aluminum. This corrosion, in fact, is very likely to occur with any plating whatever on aluminum. Generally speaking, therefore, we doubt seriously if there has been devised a process which would prove satisfactory.—G. R. G.

Q.—In making up a new nickel solution we used a galvanized iron tub to boil the same in because our steam apparatus was out of order. In trying to plate some brass shells with this solution we find that the work will plate all right on the outside, but will turn black on the inside if left in the bath long enough to cover the metal. We added half a pint of oil of vitriol, but that did not seem to have any effect on the solution or change the work any. We have been told that the solution was spoiled by being in the galvanized tub and that the best thing we could do would be to throw it out and make a new solution. We can ill afford to throw away these 130 gallons and would ask you if you can suggest something which will remedy the trouble. We send a sample of the work.

A.—It is poor practice to use any receptacle for dissolving metallic salts that is coated with zinc, and while some of the zinc coating may have been reduced and become impregnated in your solution we do not think that is the real cause of your trouble. If your solution was made up from the double salts only, it probably does not conduct properly. This would seem to indicate the trouble from the blackish appearance of the shells upon the inside. Add 2 or 3 ounces of common salt to each gallon of solution and we have no doubt your solution will plate properly.

Q.—(1) Can you give me the best formula for making a nickel plating solution? (2) Also a good method of depositing silver on glassware?

A.—(1) A good formula for a nickel bath is the following:

Sulphate of nickel and ammonia	8 ozs.
Single sulphate of nickel	1 "
Boracic acid	¼ "
Water	1 gal.

Dissolve the salts in the order written in ⅓ gallon of boiling water; add the balance of the water and use when cool. Use a current strength of 3 volts. (2) Unless you have some knowledge of this process you will find it unusually difficult. We refer you to an article entitled "Silver Deposit on Glass and Porcelain," by Joseph Dimes, in the January, 1907, issue of THE METAL INDUSTRY.

Q.—Please inform me how to get a very dark green gold without the use of arsenic.

A.—The best method for you to pursue will be to procure a green gold alloy and then make up your solution with the aid of the porous cell. This may be accomplished in the following way: Prepare a solution with cyanide so it will stand about 3 degrees Baume. Then procure a porous cell such as used in dry batteries. Clean well and prepare a strong solution of cyanide and place therein. Connect to the negative pole and your gold to the positive. Take a bunch of iron nails and support them with copper wire in the porous cell and connect to the negative pole. Use a good strong current and in a short time sufficient gold will be absorbed for your purpose. This is the best method of preparing colored golds. The solution should be slightly warm while this operation is going on.

Q.—Enclosed find a stick pin finished in rose and green gold. Kindly tell me how to produce the same shade. I want the background rose and the raised part green gold.

A.—A solution that is being used extensively for the rose gold finish consists of

Water	1 gal.
Carbonate of soda	2 ozs.
Yellow prussiate of potash	2 "
Chloride of gold	¼ "

Boil and filter the solution. Use a strong current and the solution nearly boiling. For the green gold add a little cyanide of silver to a solution consisting of

Water	2 gals.
Phosphate of soda	6 ozs.
Sulphite of soda	2 "
Cyanide of potassium	6 dwts.
Chloride of gold	6 "
Cyanide of silver	2 "

Use the solution warm and use a platinum anode. Try a little of the cyanide of silver before adding all. For painting out use air-drying Japan thinned with benzole; afterward remove with benzine.

Q.—Will you tell us a good method of making the old brass or brush brass finish on chandeliers. Our work is streaked and turns to a very dark color a few weeks after being lacquered.

A.—See the article entitled "Simple Production of the Brush Brass Finish," by Charles H. Proctor, in the April, 1907, issue of THE METAL INDUSTRY. That method is being used by many concerns in the East who claim better results than with any other. You can also use the same method, but instead of powdered pumice stone use powdered rotten stone and lard oil or any other common oil. A tampico or horse hair wheel can be used with the rotten stone if desired. Afterward wash the articles in benzine, dry in maple sawdust and lacquer in the regular way.

Q.—Let me know if it is possible to run a cyanide carbonate of copper solution bright, the same as a brass solution.

A.—Copper solutions do not as a rule produce as bright a deposit as brass. A little arsenic used in the same manner as added to a brass bath will produce a little more lustre or a slight addition of hyposulphite of soda in the proportion of 1½ ounces to each 100 gallons of solution will materially brighten the deposit.

METALLURGICAL DIGEST

A REVIEW OF METALLURGICAL MATTERS OF THE WORLD.
TRANSLATED AND EDITED BY HOWARD GREEN BAYLES, MET. E.

COPPER PLATING ON ZINC.*

TRANS. FROM DER METALLARBEITER.

The article is first cleaned in a hot solution of caustic soda (1 part soda in 5-10 parts water). This removes all grease. It is next washed in a 1 to 10 solution of sulphuric acid, to remove all scale and oxide. It is then rinsed in clean warm water. After the cleaning, which must be done thoroughly in order to produce good work, care must be taken not to touch the article with the hands, as a thin film of grease will be left by each finger. A clean pair of tongs should be used in transferring to the electrolytic bath.

In order to produce on zinc a clean, even deposit, that will not flake or blister, it is best to use the cyanide bath. This contains:

Water (distilled)	150	qts.
Copper Acetate (neutral verdigrise)	3 1-3	lbs.
Ammonia (26%)	1¼	qts.
Sodium sulphate	3	lbs.
Cyanide of potash (fused)	5	lbs.

The copper acetate is first dissolved in 30 qts. of the water, and the ammonia added to it. In another vessel, the other salts are added to the remainder of the water. The two solutions are then mixed and filtered directly into the tank that is to be used for electro-plating. The resulting bath is entirely colorless and should remain so throughout the operation of plating. Its preparation costs less than $2.

The article to be coppered is hung in this bath, and opposite it is suspended an anode of pure copper, so shaped as to be as nearly as possible at an equal distance from the cathode, or object to be plated. That is, if a candlestick or vase is being plated, the sheet of copper should be bent into a cylinder, so that the plating action will be equal on all sides. Beside this, it is well to turn the cathode from time to time.

As a receptacle for the bath, it is best to use a barrel cut in half and carefully cleaned, as it must not be forgotten that absolute cleanliness at every point of the process is essential to good work.

After the zinc article or cathode and the copper anode are properly hung in the bath in the desired positions, the cathode is fastened to the negative pole of the dynamo with a band or heavy wire of copper. This connection must be tightly made, or there will be an unnecessary amount of resistance to overcome. The anode is then connected with the positive pole, in series with a rheostat and ammeter. The rheostat is adjusted until the current passing through the bath is .025 ampere for each square inch of the area to be plated. This area may be carefully calculated, or may be estimated. That is, the usual old-fashioned type of candlestick, about 10 ins. tall, will have an area of 45 or 50 sq. ins., requiring a current of 1.25 amperes.

If properly operated, the bath should not lose strength with use. It is only necessary to use pure copper for the anode, or else slime will form in the bath, and the plating will not be smooth and clean. If, after long working, a slime has formed, the bath should be refiltered and the tub recleaned. If it appears, however, that the copper contents of the bath has decreased, this may be corrected by adding 2 or 3 ozs. of cyanide, as this salt, which is the solvent of the copper, becomes slowly decomposed through the action of the current and the air. The result of this decomposition is to liberate fumes of hydro-cyanic acid (prussic acid) gas, which is an exceedingly deadly poison. For this reason, it is essential that the plating room shall be kept well ventilated at all times. The cyanide is also poisonous, and very small quantities taken in the human system either through the mouth or through cuts will produce death. Hence the greatest care must be taken in handling it, and inexperienced or careless persons should never be allowed in the plating room.

*The translator does not feel that any apology is necessary for the confessedly elementary character of this article, as many readers will probably welcome just this sort of description. H. G. B.

ELECTRO-PLATING NON-METALLIC OBJECTS.

(Digest of article in the *Electrochemische Zeitung*.)

In discussing the subject of preparing non-metallic articles for electro-plating, it is first necessary to divide them into two classes, those that are porous and those that are impervious to water.

Any porous substance, such as wood, plaster of Paris, etc., must first be given an absolutely tight surface. This can not be done satisfactorily by simply painting with a varnish (rosin dissolved in alcohol, or paraffine in benzine). The pores can be closed tightly only by the use of some fusible material which becomes hard on cooling. Paraffine, beeswax or a mixture of beeswax and rosin may be used. Porous objects are immersed until all release of air bubbles has ceased, and then drained and cooled. The next step is to make them electrical conductors, which is done in the same method as that employed with non-porous substances. This is generally accomplished by painting first with a sticky coat of gutta-percha varnish and then sprinkling thoroughly with either plumbago or pure copper powder (generally called copper bronze, but not an alloy like most bronze powders).

One authority advises copal varnish and copper bronze. Another suggests a syrupy solution of two parts asphalt and one part mastic (previously melted together) dissolved in turpentine, followed by a sprinkling of plumbago. For coppering articles which are to contain hot water, in order that the copper shall not become detached, it is well to treat the surface before rendering it conductive with hydro-fluoric acid gas. This is made by boiling fluor-spar in concentrated sulphuric acid, and must be done carefully, as the gas is very poisonous. Instead of copper bronze, one may use for glass or porcelain pure gold leaf, or a boiling solution of platinic chloride in essence of lavender. In this case, the article is carefully heated in a muffle after treating in order to produce a deposit of metallic platinum.

In some special cases, one may have recourse to the reduction of silver solutions by solutions of phosphoric salts, the action of light and a process similar to photographic developing. These are hardly of sufficient practical importance to warrant detailed descriptions.

Another method, applicable to glass or porcelain, is to mix a solution of gold or platinum chloride dissolved in ether, with sulphus dissolved in carbon disulphide. This gives a mixture having sufficient body to apply it easily with a brush. Slow heating to a low temperature in the muffle drives off other elements, leaving a deposit of pure metallic gold or platinum.

OXIDATION PATTERNS ON COPPER.

Der Metallarbeiter describes a method of producing oxidation patterns on copper articles. The usual method, it is first pointed out, is unsatisfactory, as the use of a stencil or stop-out pattern imposes close limitations on the character of the design. It can also be used satisfactorily only on flat pieces or those having a simple shape, such as cones or cylinders. The colors produced by cold treatment in solutions are not permanent, and the design gradually becomes indistinct. The proposed process consists briefly in repeatedly heating the copepr article and chilling it quickly. The heating may be uniform, as in a furnace, or local, as by the use of a blast lamp. The chilling may be done by dropping the article into water, oil or some special chemical solution, or may also be local by holding a wet sponge or a cake of ice against the side of the object. The pattern is then worked out by hand by means of a graving tool, burnisher, or buffing wheel. Of course, this treatment is applicable only to a high grade of art work. By the use of ingenuity, experiment and a little practice, a worker who has some artistic ability should be able to produce very beautiful effects.

Associations and Societies

REPORTS OF THE PROCEEDINGS OF THE METAL TRADES ORGANIZATIONS.

AMERICAN BRASS FOUNDERS' ASSOCIATION. President, Charles J. Caley, Russell & Erwin Manufacturing Company, New Britain, Conn.; secretary, Andrew M. Fairlie, McCays, Tenn.

The following is an abstract of the letter sent out by the president, June 27:

Messrs. W. R. Webster, W. S. Allen, W. L. Abate, W. M. Corse, J. N. Gamble, Edro Richardson, J. R. Meadowcroft, W. R. Park, A. M. Fairlie, J. H. Sheeler, Nathaniel K. B. Patch.

Gentlemen:—I am advised by our secretary, Mr. Andrew M. Fairlie, that all offices are filled, each member having signified his acceptance of the office to which he was elected, and that he will be pleased to serve for the term of one year. I wish to thank you, gentlemen, one and all, and I ask and desire your hearty co-operation in building up our organization, which I hope at the end of my term will be the largest of its kind. We can do this if we all work with a will, each doing his share. We have a large field to cover, there being upwards of four thousand brass founders in the United States. As soon as possible we propose to send out a circular letter to each foundryman in the country. Through the courtesy of THE METAL INDUSTRY I am able to procure two tabulated lists containing about 3,385 names of brass founders in the United States. This list is made up by States, and I would suggest the purchase of two lists, one to be held by the secretary to facilitate his work, and the other to be divided among the vice-presidents, each getting a list of the names of foundrymen in the States within his jurisdiction. This list will remain the property of the American Brass Founders' Association, to be returned to the secretary on the expiration of the term of office of each vice-president. Having a copy of this list on hand will enable you to address firms within your jurisdiction, whom you probably never knew existed.

In due time official stationery will be forwarded you. This, I believe, you will appreciate, as it will add prestige to your correspondence and carry more weight than ordinary letter head.

Now, as to the payment of bills, I believe that the secretary should send the vouchers, properly endorsed, to me for approval, and if I believe the expenditure to be justified, I will O. K. same, forwarding them to the treasurer, who will in turn affix his signature and return to the secretary with the necessary cheque, the secretary attending to the payment of same. This will give us three names on the vouchers which, I believe, will be acceptable to you all. There is one other thing I would like to suggest and that is a meeting of the executive board some time in the late fall, say in New York or some other place you may consider more central. At that time we will be better able to judge whether the policy we are pursuing is correct, and if necessary change to meet the wishes of the majority. I would further add that you will receive notice from time to time from the secretary on matters involving the policy of the association, though I believe, as stated above, that a meeting in the fall would be a good thing, bringing us together again before the annual meeting, which would enable us to get better acquainted with one another than would be possible through correspondence. I would be pleased if you would write me fully on all matters contained in this letter, that I may feel sure of your approval of same.

With kindest regards, and wishing you every success in your work, believe me, Very truly yours,

CHAS. J. CALEY,
President.

FIFTY CHARTER MEMBERS.

Since the publication in the June number of THE METAL INDUSTRY of official members to date the membership has doubled. All who joined on or before July 1st are listed as charter members and we herewith publish the list:

Abate, W. L., Nathan Mfg. Co., New York, N. Y.
Antisell, F. L., Raritan Copper Works, Perth Amboy, N. J.
Allen, W. C., Yale & Towne Mfg. Co., Stamford, Conn.
Allan, Andrew, Jr., A. Allan & Son, New York, N. Y.
Corse, W. M., Detroit Lubricator Co., Detroit, Mich.
Cramp, C. D., Cramp's Ship Yards, Philadelphia, Pa.
Crist, W. E., Crist Valve Mfg. Co., Chittenango, N. Y.
Caley, Chas. J., Russell & Erwin Mfg. Co., New Britain, Conn.
Cox Brass Mfg. Co., Albany, N. Y.
G. A. Doeright, The Falcon Bronze Co., Youngstown, O.
Damascus Bronze Co., Pittsburg, Pa.
Doeright, G. A., The Falcon Bronze Co., Youngstown, Ohio.
Empire Mfg. Co., London, Can.
Evans, Thos., Eynon-Evans Mfg. Co., Philadelphia, Pa.
Fairlie, A. M., Tennessee Copper Co., McCays, Tenn.
Freysinger, John B., Winchester Repeating Arms Co., New Haven, Conn.
Gamble, J. N., Western Tube Co., Kewanee, Ill.
Gutsche, J. A., 682 E. 102d St., Cleveland, O.
Hartman, Wm. T., P. & F. Corbin, New Britain, Conn.
Howe, Jeremiah, Mich. Copper and Brass Co., Detroit, Mich.
Kasjens, Jacob J., Brass Fdy. & Htg. Co., Peoria, Ill.
Langdon, Palmer H., THE METAL INDUSTRY, New York, N. Y.
Lonergan, John E., 211 Race St., Philadelphia, Pa.
Lane, Henry M., The Frontier Co., Cleveland, O.
Marshall, R., Copper and Brass, Detroit, Mich.
McConnell, D. A., Lovell McConnell Mfg. Co., Newark, N. J.
Moldenke, Richard, Amer. Foundrymen's Assn., Watchung, N. J.
Mueller, Philip, H. Mueller Mfg. Co., Decatur, Ill.
Meadowcroft, J. R., The Garth Co., Montreal, Can.
Neville, W. E., R. B. Seidel, Inc., Philadelphia, Pa.
Park, W. R., United Injector Co., Boston, Mass.
Powell Co., The Wm., Cincinnati, Ohio.
Patch, Nathaniel K. B., Lumen Bearing Co., Toronto, Can.
Quigley, W. S., Rockwell Engine Co., New York, N. Y.
Regester, E. C., J. Regester Sons Co., Baltimore, Md.
Reilly, Martin J., Franklin Brass Fdy., Brooklyn, N. Y.
Renneberg, Chas., McNab & Harlin Mfg. Co., Paterson, N. J.
Richardson, Edro, Brass Founder, Baltimore, Md.
Ross-Tacony Crucible Co., Tacony-Philadelphia, Pa.
Schutz, J. H., H. Mueller Mfg. Co., Decatur, Ill.
Speakman, Willard A., Speakman Supply & Pipe Co., Wilmington, Del.
Smith, Wm. A., Atlas Brass Foundry, Brooklyn, N. Y.
Sheeler, J. H., Sheeler-Hemsher Co., Philadelphia, Pa.
Taylor, U., Robt. Taylor & Son, Paterson, N. J.
Tallman, A. H., J. N. Tallman & Sons, Hamilton, Can.
Wakefield, F. W., F. W. Wakefield Brass Co., Vermilion, O.
Walters, Geo. W., Dent Hardware Co., Fullerton, Pa.
Wilson, Wm. L., U. S. Aluminum Co., Pittsburg, Pa.
Wiesing, Geo. F., Sayre Stamping Co., Sayre, Pa.
Wright, Granville G., Reading Hdw. Co., Reading, Pa.
Webster, Wm. R., Bridgeport Brass Co., Bridgeport, Conn.

NATIONAL ASSOCIATION OF BRASS MANUFACTURERS. President, E. F. Needecker; commissioner, Wm. M. Webster, Schiller Building, Chicago, Ill. The second quarterly meeting of the association was held at the Parker House, Boston, Mass., on June 25 and 26, which, notwithstanding the intense heat that prevailed at that time, was well attended. A number of new members were taken in. The association re-affirmed present prices and ordered that no change be made in the list of brass goods until January 1, 1909, and appointed the following standing list committee to take up such changes as may be deemed advisable to be made on that date:

J. H. Glauber, Cleveland, Ohio; A. S. Hills, Haydenville, Mass.; H. M. Hoelscher, Chicago, Ill.; W. H. Wasweyler, Milwaukee, Wis.; J. W. Sharp, Jr., Philadelphia, Pa.

The meeting adjourned to meet at Buffalo on September 18 and 19 next.

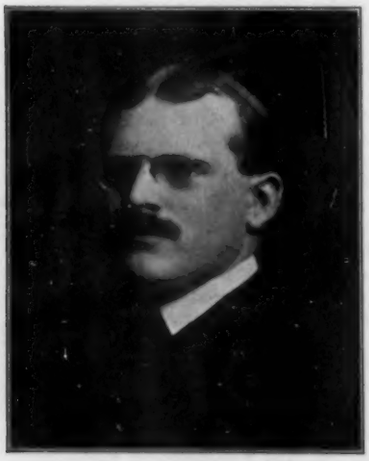
The Associated Foundry Foremen of Chicago and vicinity held their first annual foundrymen's exhibit in the foundry of the engineering building at Lewis Institute, Chicago, on April 24. The exhibition comprised 10 molding machines, a complete line of pneumatic tools for the foundry, core machines and a magnetic separator in operation. There was also a very complete exhibit of pattern makers' machinery. The exhibitors were some of the most prominent manufacturers of foundry supplies and equipment in Chicago and near-by centers.

ITEMS OF INTEREST TO THE INDIVIDUAL.

ASSOCIATION VICE-PRESIDENTS.

Last month we published portraits of several of the vice-presidents of the American Brass Founders' Association. We now present portraits of the other two, namely, Messrs. Corse and Patch, and H. R. Atwater, third vice-president of the Foundry Supply Association. Those who have read our account of the proceedings published in our last issue will recall the fact that the vice-presidents of the Brass Association were chosen geographically from the Eastern, Middle and Western States and Canada, so that the country would be covered as completely as possible. Much of the work, particularly that of a preliminary nature, will fall upon the vice-presidents, and the American Brass Founders' Association is to be congratulated in having obtained the services of earnest, energetic men to fill these offices. The same can be said of the officers of the Supply Association.

Vice-Presidents American Brass Founders' Association.



W. M. CORSE.

N. K. B. PATCH.

Vice-President Foundry Supply Association.

H. R. ATWATER.

WILLIAM MALCOLM CORSE.

Mr. Corse is a native of Massachusetts, having been graduated from the Medford High School and Massachusetts Institute of Technology in the Department of Chemistry. After graduation he spent several years in the manufacturing, pharmaceutical and paint business. In January, 1903, he went with the Detroit Lubricator Co. as chemist and he now holds the position of assistant superintendent with that concern and is in charge of their foundry and chemical laboratory. He is a member of the American Chemical Society and secretary of the Society of Detroit Chemists. Since his appearance in the brass business he has always been active in advocating more scientific control of our foundries and is a firm believer in the value of a chemical laboratory for a brass foundry, as well as for an iron foundry or steel mill.

NATHANIEL K. B. PATCH.

Mr. Patch studied mechanical engineering at the Massachusetts Institute of Technology, Boston, Mass., leaving there in 1900 to take up a position with the Buffalo Smelting Works as an assistant master mechanic. He left there to become a representative of the Lumen Bearing Company, Buffalo, N. Y., on January 1, 1907. After traveling in this capacity for a year he was made assistant manager of the company and in October, 1904, was sent to Canada to prepare for the opening of the Canadian branch of the company at Toronto, which was formally opened for business on January 1, 1905.

H. R. ATWATER.

Mr. Atwater has devoted practically his entire life to the manufacture and selling of brushes, brooms and foundry supplies. He became connected with the Osborn Manufacturing Company, of Cleveland, O., in 1894 and for the last twelve years has made a careful study of those lines of brushes and brooms specially adapted to the use of founders and manufacturers. Mr. Atwater has a broad acquaintance with the foundrymen and ironworkers of the country, who appreciate his practical knowledge of their requirements, together with the fact that they can place absolute confidence in his representations. He is a strong man among the buyers of his company's goods because his record for many years has merited and earned their entire confidence.

SECOND ANNUAL OUTING OF THE CLERKS OF THE AMERICAN BRASS COMPANY.

A most enjoyable outing was held by the clerks of the American Brass Company at Steeplechase Island, Bridgeport, Conn., on June 22. The company was made up from the offices of the Waterbury Brass Company, the Ansonia Brass & Copper Company, the Benedict & Burnham Manufacturing Company, the Holmes, Booth & Haydens Company and the Coe Brass Manufacturing Company. While some of the officials of the several companies were present, the outing was given by the office clerks and was strictly their own affair. They had with them as their guest their oldest employee, Samuel Lowe, who has been with the Benedict & Burnham Manufacturing Company continuously for 55 years and is still a valued employee in charge of a department. F. W. Gray was chairman of the banquet committee.

The menu read as follows, with the exception of the translation, which we have placed in brackets:

Extrusion Junk
(Clam Chowder)
Seamless Tubes
(Steamed Long Clams)
Copper Scale with Light Annealed
(Broiled Bluefish with French Fried Potatoes)
Committee with a la Overhauling
(Lobster with Saratoga Chips)
German Silver Extra Spring
(Spring Chicken)
Cold Rolled
(Salad)

Scrap	Roller Oil	Wire Cable
(Crackers and Cheese)	(Coffee)	(Cigars)

The toastmaster was R. A. Cowles, treasurer of the Ansonia Brass & Copper Company. The addresses were: "The Brass Industry One Hundred Years Ago," by H. M. Steele; "The Joys of a Clerk," by J. L. Smith; "The Under Dog," by C. E. Beardsley; "The Relation of Salesmen to Office," by F. H. Sherwood; "Credits and the Passing of Orders," by E. C. Boise; "The Office," by A. L. Brewer, and "The Salesman and Collections," by T. M. Baker.

The program was very handsomely gotten up, the front cover showing views of the several plants as they existed about fifty years ago: The Benedict & Burnham Manufacturing Company, in 1859, established in 1823; the Waterbury Brass Company in 1858, established in 1845; the Ansonia Brass & Copper Company, established in 1847; Holmes, Booth & Haydens Company in 1858, established in 1853; and the Coe Brass Manufacturing Company, established in 1863.

Dr. Richard Moldenke, secretary of the American Foundrymen's Association, has sailed for Bermuda. The doctor announces that he is going for pleasure and pleasure only, but those who know him best emphatically declare that there will be a large amount of hard work mixed with the pleasure part of the trip.

W. P. Shepard, of the firm of Rogers, Brown & Co., of Buffalo, N. Y., who was elected first vice-president at the meeting of the Foundry Supply Association, Philadelphia, May 24, has resigned on account of being unable to give attention to the office.

C. M. Dally, American representative of Bates & Peard Annealing Furnace Company, reports that he has contracts for the sale of 50 of his annealing furnaces, and expects all of them to be in operation within three months' time.

E. S. Porter, who was connected with the Publicity Department of The E. W. Bliss Company, of Brooklyn, N. Y., for a number of years, has resigned and his position has been taken in charge by H. C. Seaman, Secretary of the Company. Mr. Porter has taken up another line of work.

Royal F. Clark, of Trenton, N. J., has accepted a position with the Sumter Telephone Manufacturing Company, Sumter, S. C., as foreman Electro-plater. The company is enlarging their plating department and installing modern methods of plating.

John Logan, foreman of the brass foundry of the National Cash Register Company, of Dayton, O., is now visiting the most modern foundries of the country for the purpose of studying the latest wrinkles in foundry construction and equipment. His company will build an entirely new foundry and install new equipment throughout.

The Mexican papers note the visit to Mexico City of W. C. Branham, general agent of the American Brass and Copper Company, New York.

Robert F. Mathews, formerly foreman in the brass manufacturing department of the Charles Parker Company, Meriden, Conn., has severed his connections with this company to accept a position of superintendent of the Mitchell Vance Company, manufacturers of gas and electric fixtures, New York City.

R. A. Shailer, of Hurd & Haggin, 316 Hudson street, New York City, who manufacture "Fahrig" metal, was a guest on one of the racing yachts that made the trip to Bermuda.

J. F. Hubbs, formerly with the Continental Silver Company, of Scottdale, Pa., has accepted a position to take charge of the polishing and plating departments of the Bowmanville Foundry Company, of Bowmanville, Ontario, Canada.

The twenty-one managers of the United Lead Company were entertained recently at St. Louis, Mo., by the Hoyt Metal Company. Edward R. Hoyt, president, in charge. The entertainment consisted of a dinner, tally-ho party, etc.

DEATHS

E. L. Babcock, founder of the Falls Rivet & Machine Company, Cuyahoga Falls, Ohio, and for years engaged in the management of that company, died June 17 at the Masonic Home, Springfield, Ohio, where he went two years ago because of ill health. He was 67 years of age.

George Zahn, who has been a manufacturer of harness, hardware and metal goods for fifty-five years, died June 24th at his home in Newark, N. J., age 73. His business will be carried on by his sons at the same address, 46 Mechanic street, Newark.

PATENTS

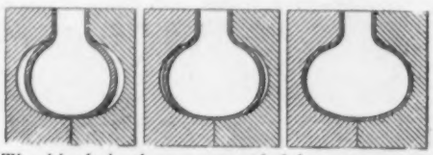
REVIEW OF CURRENT PATENTS OF INTEREST TO THE READERS OF THE METAL INDUSTRY.

850,897. April 23, 1907. Soldering Iron. Henry Berg, of Orange, N. J. This soldering iron is of the gasoline type, in which a constant fuel feed is provided with which to heat the bit and also to provide supplemental means for regulating the combustion and consequent consumption of fuel. In soldering irons of this type much difficulty is experienced in maintaining a constant flow of fuel to the burner and a uniform and very intense heat within the bit or head of the iron. It is stated that this difficulty has been entirely overcome in the new device.

851,166. April 23, 1907. Molding Machine. Charles Herman, of Allegheny, Pa. Assignor to Herman Pneumatic Machine Company, of Zelienople, Pa. This machine, while simple in its construction and operation, is durable and by its use it has been found that the sand will be easily, rapidly and thoroughly packed around the pattern to form a perfect mold cavity. The stripping plate and flask can be easily raised from around the pattern and without the employment of any hard or manual labor. The lifting shafts for raising the flask are controlled at all times by a toggle joint connected with the rock shaft, thereby overcoming any tilting or wabbling of the flask during such raising.

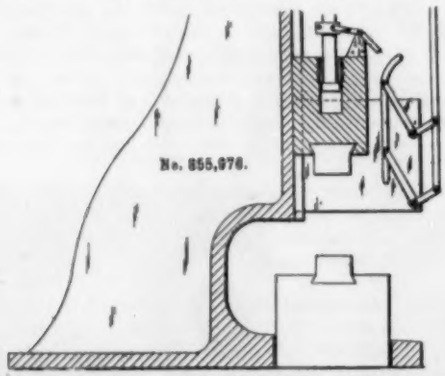
847,269. March 12, 1907. Sand Blast Apparatus. F. M. Wise, of New York City, assignor to American Diamond Blast Company, a corporation of New York. This machine is adapted for cleaning the surfaces of stone, metal, wood, etc. The main feature of the invention is the method adopted of collecting and returning the sand to the reservoir for repeated use.

857,616. June 25, 1907. Forming Seamless Metallic Hollow Vessels. John H. Gault, of Philadelphia, Pa., assignor to the International Silver Company, a corporation of New Jersey. By successive operations a cylinder is formed with a contracted



portion. The blank is then surrounded by a two-part mold and an expander is forced against the inner wall. After treatment the vessel is removed from the mold, the metal treated and the vessel replaced in the mold and the last action repeated. This method is followed until the vessel fills the mold.

855,976. Drop Hammer. Carl Prott, of Hagen, Germany. In steam and air drop hammers the piston is, as a rule, connected with the hammer head or drop either rigidly or resiliently. The latter connection is affected by placing between the end of the

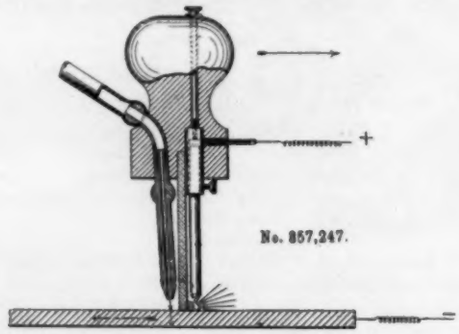


piston rod and the drop an elastic pad by which, on the latter dropping down, the inertia of the piston rod is neutralized. In this hammer the piston rod in a similar way slides in the hammer head, but no elastic pad is used. The inertia of the piston rod sliding in the drop is utilized here for reversing.

849,927. April 9, 1907. Alloy. A. H. Smith, of Philadelphia, Pa., assignor to the American Bronze Company, a corporation of Pennsylvania. This is a bearing metal alloy which is hard and possesses superior wearing qualities. The mixture is composed of 20 pounds of zinc, to which is added 80 pounds of tin. The tin is added in small quantities. To this mixture is added 4 ounces of a mixture of 1 pound of sal ammoniac and 1 ounce of potash. This is called by the inventor the "foundation compound." Twenty pounds of copper are then melted and to it are added 3 pounds 2 ounces of the foundation metal, the molten metal being stirred during the mixing. It has been found that the most satisfactory results are obtained when a portion, about one-half, of old mixture is added to the new.

850,168. April 16, 1907. Molding Process. Aaron R. Marsteller, of St. Louis, Mo. The primary object of this invention is to affect a saving of time, labor and expense in metal and other molding, and these objects are attained by the provision of two or more sets or gangs of men who can, by the employment of durable matrices, work in the formation of molds from a single pattern and produce such molds from the said matrices with the minimum effort on their part. The chief ingredients of the matrices are sand, oil, litharge and asphaltum, which are so treated as to produce a solidified mass which is plastic, electic and yet durable, retaining permanently the impression which may be formed upon it. The pattern is first molded in sand and then the above mentioned material is placed in the mold and from this the casting mold is formed.

857,247. June 18, 1907. Apparatus for Fusing Metals. Adolph Ernst Menne, Crenzthal, Germany. This invention is applicable for fusing metals, sheets of metal, and the like, and employs oxygen and electricity. The gas supply is affected quite independently of the supply of current. In this way the important result is first of all obtained, that the oxygen cannot act on the electrode which has become heated by the electric current and cause it to become overheated, and second, the

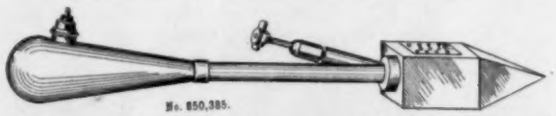


oxygen does exercise a blowing action on the arc as a partition separates the two, as shown in the drawing.

858,160. June 25, 1907. Anode. Alexander J. Deloye, of Torrington, Conn. The object of this invention is to provide an anode having a plurality of projections or spurs forming a large

working surface and thereby greatly facilitating the plating operation. The anode may be cast for use in plating with gold, silver, nickel, copper, brass, bronze, or any other metal.

850,385. April 16, 1907. Self-Heating Soldering Iron. R. W. Marvell and H. M. Ashman, of Baltimore, Md., assignors to E. A. Scott, of Philadelphia, Pa. In this iron the hollow metallic handle is partly filled with gasoline. An air pump is then attached to the valve on the handle and air is pumped into the



handle. The needle valve is then opened and the gasoline allowed to flow. The escaping gasoline is ignited through a door in the iron, which is then closed, and within a short time the iron is ready for use. The heat can be regulated by the needle valve and the fire extinguished by stopping the flor of gasoline.

856,392. June 11, 1907. Aluminum Alloy. Alexander Chambaud, of Paris, France. The following alloy is claimed to be very elastic, malleable and ductile, and more tenacious than copper: Aluminum, 99,020 per cent.; iron, 0,310 per cent.; zinc, 0,010 per cent.; magnesium, 0,041 per cent.; copper, 0,610 per cent. The remaining 0,009 per cent. is comprised of the silica which is found in the aluminum.

856,307. June 11, 1907. Wire-working Machine. John G. Smith, of Chicago Heights, Ill. This machine is intended for forming loops at intervals in a strand of wire. The machine is stated to be rapid and effective in operation and to handle the wire with the least possible manual labor.

856,847. June 11, 1907. Pipe Bending Machine. P. J. Connors of Greenville, Pa. The main object of this invention is to provide a machine having a stationary die and a reciprocating die operated under pressure to compress the pipe between the dies and form the desired curvature or bend in the pipe, the curvature or bend being formed without bulging or breaking the pipe.

857,173. June 18, 1907. Molding Machine. H. E. Hodgson of Cleckheaton, and J. Hartley of Manchester, England. This invention relates to molding machines in which the box is reversed to enable it to be withdrawn from the pattern plate. It is particularly applicable to machines operated by pneumatic pressure.

TRADE NEWS

TRADE NEWS OF INTEREST DESIRED FROM ALL OF OUR READERS. ADDRESS THE METAL INDUSTRY, 61 BEEKMAN STREET, NEW YORK.

"Rotoplater" is the name chosen by the Zucker & Levett & Loeb Company, New York City, for their mechanical electroplating apparatus.

The Walrine Wheel Company, 47 Hamilton street, Newark, N. J., are offering to the platers and polishers solid leather "Walrine" wheels and brushes.

The Otto Adams Brass Company, of New York City, has been incorporated with a capital of $10,000. The incorporators are: Joseph Shapera, Isaac Shapera and J. P. Rosenthal, all of New York.

The Rockwell Engineering Company, 26 Cortlandt street, New York, report the sale of eleven of their double chamber furnaces in thirty days, this being one of their best records.

E. O. Grabs, manufacturer of machinery at 180 Centre street, New York, has recently sold a gap spinning lathe, suitable for brass and silver work, to a large firm, at Spokane, Wash.

The Ohio papers report that the works of the Morgan Engineering Company at Alliance, Ohio, is to have all of its castings made by the Bunting Brass and Bronze Company of that city.

The Bristol Brass Company, of Bristol, Conn., have let the contract for an addition to their plant, consisting of a reinforced concrete-steel building, 67x67 feet. The work will be begun at once.

Albert A. Moers, a metal dealer of 24 Stone street, New York, offers for sale 50 tons of gun metal, five tons of small type, fifty tons of heavy brass and five tons of electrotype. Inquiries are solicited.

The MacFarland-Snyder Company, manufacturers of polishers' and platers' supplies, formerly located in the Rose Building, Cleveland, Ohio, are now located in the Browning Building of the same city.

The Bureau of Supplies and Accounts, Navy Department, Washington, D. C., will receive bids July 23 for quantities of rolled bronze, solder, pig tin, brass and copper. Blank proposals may be obtained of the Bureau.

Articles of incorporation of Jacob Hofer, of Brooklyn, N. Y., have been filed with the State Department, with a capital of $3,000. The company will deal in metal goods and machinery. The incorporators are: Jacob Hofer, G. J. Hofer, R. J. Hofer, M. C. Hofer and Caroline Hofer, all of Brooklyn.

The new foundry of the Empire Brass Foundry, Binghamton, N. Y., has ample equipment for the casting of brass, bronze and aluminum. The motto of Mr. O'Shea, the proprietor, has always been: "What we do, we do well."

H. K. & F. S. Benson, of Glen Ridge, N. J., who have been manufacturing brass and copper sheets and rolls for years have recently added to their products lining metal for automobile bearings, copper for electrical purposes.

The Columbia Manufacturing Company, makers of art ware in solid silver, have moved from 46 Oliver street to 24 Boudinot street, Newark, N. J., where they have a larger plant and better equipment for promptly filling orders.

C. M. Dally, 29 Broadway, New York City, American agent for the Bates & Peard Annealing Furnace Company, of Liverpool, England, sails for the latter country on July 17 for a two months' trip, combining pleasure and business.

A Syracuse (N. Y.) dispatch reports that the Syracuse Aluminum and Bronze Company, has bought a lot at Syracuse for a large plant and have engaged the J. D. Smith Foundry Supply Company, of Cleveland, Ohio, to prepare the plans.

The Wilson Stove and Manufacturing Company, of Anniston, Ala., are installing a complete nickel plating plant which will enable them to make and build their steel ranges and stoves complete from start to finish within their own plant.

The Manitowoc Aluminum Company, of Manitowoc, Wis., which had under consideration the abandonment of its plant at that city and the location at South Chicago, has been induced to remain and will shortly let contracts for additional buildings.

L. G. Delamothe, the electro chemist of North Chicago, Ill., reports that he is making a number of hat pins and that they are selling very well. The pins are metallized flowers, such as rose buds, pinks and daisies, and are nicely packed in separate boxes.

The Partamol Company, 415 Broadway, New York, report a heavy and increasing business in the manufacture of their parting compound. The company have recently increased their factory, adding new machinery and installing a new 50 h. p. engine.

Announcement is made by the Seymour Manufacturing Company, Seymour, Conn., that besides brass, copper and bronze in sheets, wire, rods and tubes, they manufacture copper and nickel anodes, resistance wires, fuse wire, solder wire, shot copper, nickel wire and spark plug wire.

The new nickel plating department of the Weir Stove Company, of Taunton, Mass., has been completed and will be running as soon as work upon the water mills has been finished. When they have been installed many more polishers will be put to work and the whole plant in operation.

The Nelson Manufacturing Company of Topeka, Kan., are doing all kinds of casting in brass, bronze, aluminum and gray iron. They also handle nickel plating and polishing, punch, press and die work. A large part of their business is the getting out of model and experimental work for inventors.

Connecticut papers announce that the Coe Brass Manufacturing Company have bought the mill of the Warrenton Woolen Company of Torrington, Conn., and will use the property for increasing the Coe Works. It is stated that the brass industry in Torrington now employs upwards of 2,000 men.

Charles H. Birmingham, of 231 S. Exeter street, Baltimore, Md., is making a specialty of German silver castings and has secured several good orders lately. He also casts pure nickel and pure copper. He is a manufacturer of underwriters insurance solder and is the inventor of pro-platinum used for electrical purposes.

The Excelsior Brass Works, of Reading, Pa., report a brisk season and every department running full-handed. The company make a specialty of large and small castings to order, particularly for the chandelier trade. They are also busy on a large line of portables and solid bronze hotel goods, such as ash trays, cuspidors, match boxes, etc.

Having put its new plant in operation, the Barlow Manufacturing Company, of Holyoke, Mass., have increased their equipment for doing light metal work of all kinds in brass, steel and iron and the manufacture of brass coatings and tubing. They

also do stamping, spinning and electro-plating. They insure prompt delivery and solicit correspondence.

The James Morrison Brass Manufacturing Company, of Toronto, Canada, are erecting a four-story brick and steel addition to their factory. It was not the intention to proceed with this work just now, but the recent fire at the plant compelled he company to take immediate action. The company make valves, phosphor bronze supplies for sulphite mills, gas and electric fixtures, etc.

The National Brass and Copper Tube Company, Hastings-on-Hudson, N. Y., are now testing the machinery preparatory to running their new mill, which they expect to have in operation this month. They will manufacture brass and copper tube for the general market. The company is connected in its management with the National Conduit and Cable Company of New York. The new mill has up-to-date equipment and ample capital for its operation.

The reports which have been making the rounds of the daily press in regard to the shutting down of the Wisconsin Brass Company, of Port Washington, Wis., are entirely without foundation. The company inform us that they have not shut down, although it is their intention to discontinue the manufacture of plumbers' brass work. There has never been any question about the assets of the company covering all debts, and no one will lose a penny in the deal.

The Worcester Pressed Steel Company, of Worcester, Mass., announce that besides their extensive work in steel they also manufacture goods in brass, bronze, copper and aluminum. Their specialty is stampings and cold forgings and their products include 87 varieties, from ball bearings to dust shields. They also do autogenous welding. They solicit correspondence from all parties who are looking for estimates on light and heavy stampings and cold forgings.

One of the novel novelties given away as souvenirs at the recent Foundry Exhibit of Philadelphia was the needle holder of Stanley Doggett, New York, a manufacturer of parting compounds. The holder was of the shape of a chess castle. It contained needles of various sizes and any particular size could readily be had by turning a slide. One of the other Doggett souvenirs was an automatic telephone card index which was distributed among the various exhibitors. Mr. Doggett is now selling his "Perfection" parting compound through a number of agents, including Cutter, Wood & Stevens, the New York Sand and Facing Company, and Frank E. Sutch.

FIRES

A dispatch from Ohio states that the Canton Brass Company, of Canton, Ohio, has been practically destroyed by fire. Loss, $25,000.

The Flour City Ornamental Iron Works, Minneapolis, Minn., recently sustained severe damage by fire; repairs have been made and work resumed. The company has in contemplation the erection of a fireproof foundry 75x200 feet, plans for which are now being drawn.

The fire at the plant of Mitchell-Van Meter Brass Foundry, Reading, Pa., on June 19, was but a slight affair, the damage only amounting to about $300. The building in which the fire occurred was used for melting rosin and filling and bending flush pipe. The main buildings were not affected in the least and business was not interrupted.

FINANCIAL

The Pittsburg Lead and Zinc Company has declared a dividend of 2 cents a share payable July 15.

The Standard Brass Foundry Company, of Sidney, O., has increased its capital from $10,000 to $50,000.

The Vulcan Detinning Company, of Chicago, Ill., has declared the regular quarterly dividend of 1¼ per cent. on its preferred stock.

The International Nickel Company has declared the regular quarterly dividend of 1¼ per cent. on the preferred stock payable August 1.

The Duplex Metal Company, 208 Fifth avenue, New York City, has increased its capital from $3,000,000 to $3,500,000, the new stock being preferred.

The net earnings of the Calumet & Arizona Copper Company for the first six months of the current year are estimated at $3,400,000. Out of this amount $2,000,000 has been paid in dividends.

The Standard Brass Foundry Company, of Cleveland, Ohio, makers of brass, bronze, copper, aluminum and nickel castings, have increased their capital from $10,000 to $50,000, and will begin the erection immediately of a large addition to their plant. The new building will be one story, 64x98 feet, and will be used as a molding room. The present plant contains 21,000 square feet. Some 200 men will be employed when the additions have been finished. An order has been placed with the J. D. Smith Foundry Supply Company, of Cleveland, Ohio, for ten furnaces and a number of core ovens. The improvements now under way will probably make this one of the largest and most complete jobbing brass foundries in the United States.

INCORPORATIONS

The Detroit Alloy Casting Company, of Detroit, Mich., has filed articles of incorporation with a capital of $10,000.

The Miami Silver Company, of Cincinnati, O., has been incorporated with a capital of $10,000 by Albert Young and others.

The Noakes Metal Works, of Chicago, Ill., has been incorporated with a capital of $1,000 by Joseph T. Tyrrell, L. W. Thompson and Percival Steele.

The Eagle Brass Foundry Company, of Seattle, Wash., has been incorporated with a capital of $10,000 by Alex G. Howat, William Anderson and John Tracy, all of Seattle.

The William Howell Brass Works Company has been incorporated at Camden, N. J. Capital, $50,000. Incorporators, John S. Turner, C. Harry Latham and Frank R. Howell.

The Advance Foundry Company, of Dayton, O., has been incorporated with a capital of $25,000 by Thomas M. Sweetman, George A. Engel, Annie Engel, William C. Kette and Mary C. Sweetman.

The Fostoria Aluminum Manufacturing Company, of Fostoria, Ohio, has been incorporated with a capital of $25,000 by William Rocklorff, Ole Hendrickson, Max Auman, S. L. Garter and Carl H. Anderson.

The Automobile Company, of Kittery, Maine, has been incorporated with a capital of $1,000,000 for the manufacture of all kinds of vehicles. The president is J. W. Hawes; treasurer, H. P. Knowlton.

The Camden Electro-Plating Company, of Camden, N. J., has been incorporated with a capital of $125,000 by Garret Slawter, James D. Eastwick, Emil G. Voegtlin, Edward T. Homan and M. Bergen Stone.

The Wabash Metal Manufacturing Company, of Wabash, Ind., has been incorporated with a capital of $15,000 by John M. Harter, Charles Latchem, Joseph W. Murphy, Benjamin Cook and Alfred Harter.

The Atlantic Brass & Iron Foundry, of Boston, Mass., has been incorporated with a capital of $35,000. The president and

treasurer is Philip Broomfield, of Chelsea, Mass.; clerk, Morris Broomfield, same place.

The Wallingford Art Novelty Company, of Wallingford, Conn., has filed a certificate of incorporation with a capital of $10,000. The incorporators are Edwin T. Carter, Matthew Cunningham and Dwight T. Carter.

The Whitney Emery Company, of Boston, Mass., has been incorporated with a capital of $15,000. The president is Wallace Whitney, treasurer, William F. Mooers, and the clerk, Howard A. Whitney, all of Boston.

The Orange Manufacturing Company, of Orange, N. J., has been incorporated to manufacture stamped goods of metal. The capital is $10,000 and the incorporators are Charles H. Phillips, James E. Phillips and Anna M. Phillips.

The G. A. Lutz Company, of New York City, has been incorporated with a capital of $25,000 by C. E. Lockwood, Essex Falls, N. J., G. A. Lutz, New York City, and R. B. Corey, Plainfield, N. J. The company will make electrical appliances.

The Old Colony Silver Company, of Newburyport, Mass., has been incorporated with a capital of $3,000 to carry on the business of silversmiths, etc. The president is James H. Hunt, treasurer, Edward C. Colby, and clerk, Joseph E. O'Marah.

Bippart, Griscom & Osborn, of Newark, N. J., have been incorporated to manufacture jewelry and silverware. The capital is $600,000 and the directors are James D. Boyd, Harold D. Elgar and Eugene D. Alexander, 23 Marshall street, Newark.

The Campbell Lock Company, of Plainfield, N. J., has been incorporated with a capital of $100,000, by John S. Sampbell and William S. Campbell, of Plainfield, and Joseph D. Baucus, of New York City. The company will manufacture locks, bolts, tools, etc.

The Joseph McGee Iron & Brass Foundry Company, of Queens Borough, N. Y., has filed a certificate with the Secretary of State announcing that the amount of their capital stock has been increased from $12,000 to $40,000, divided into shares of $50 each.

The Overland Electric Company, of Syracuse, N. Y., has been incorporated with a capital of $100,000 by T. Arthur Whitaker, of Syracuse, N. Y.; Wm. J. Chatlin, of Philadelphia, Pa., and Herbert C. Eldridge, of Albany, N. Y. The company will manufacture car heating apparatus.

The Glorieux Smelting and Refining Company, of Irvington, N. J., has been incorporated with a capital of $350,000 by William L. Glorieux, Charles Engelbard and L. E. Warren, all of Irvington. The company will refine and deal in gold, silver, platinum, copper and other metals.

The Automatic Chain Company, of Buffalo, N. Y., has been incorporated with a capital of $300,000 to manufacture metal chains. The directors are Charles W. Underwood, Paulding F. Sellers, Robert C. Palmer, Elgood C. Lufkin, Charles R. Huntly and DeLancey Rankin, all of Buffalo.

The Bunting Brass and Bronze Company, of Alliance, O., has completed plans for incorporation with a capital of $50,000. The incorporators are W. H. Morgan, W. H. Ramsey, W. H. Bunting, William Bunting, and E. N. Higgins. The company will make and sell all kinds of brass, copper, aluminum and like goods.

The Consolidated Copper Company, of New York City, has been incorporated at Dover, Del., with a capital of $50,000,000. The company is authorized to mine copper and other ores, particularly in the Yukon territory of Alaska. The incorporators are: Edward H. Neary, Anton J. Dittmar and Ralph Brill, all of New York City.

The E. A. Stege Manufacturing Company, of Louisville, Ky., have filed articles of incorporation in the County Clerk's office with a capital stock of $15,000, divided into share of $100 each. The company will do metal plating, brass founding and polishing. The incorporators are Louis Stege, George Stege, Edward Grameneyer and John Wendhorst, all of Louisville.

A charter has been granted by the State of Virginia to the Scott Metal Company, Incorporated, 2400 E. Main street, Richmond, Va. George H. Scott, president and general manager; Edward V. Breeden, secretary and treasurer, both of Richmond. The capital stock is $2,500 to $10,000. The company is running a brass foundry, making a specialty of large work, and also producing a line of babbitt metals suitable for all uses.

PRINTED MATTER

"KLINGERIT" GASKETS, which will not press out of the joints, are considered in a circular received from the Crane Company, of Chicago, Ill.

BUFFING AND POLISHING WHEELS. A card has been received from F. L. & J. C. Codman, South Boston, Mass., calling attention to their stitched canvas polishing wheels.

SILVERWARE.—The Ideal Manufacturing Company, Middleboro, Mass., have issued a leaflet on their patented "Ideal Olive Spoon and Pickle Fork."

LAWN SPRINKLERS. A very complete catalogue sent out by the W. D. Allen Manufacturing Company, of 151 Lake street, Chicago, Ill., deals with their extensive line of lawn sprinklers and accessories.

GENERATORS AND MOTORS. The Barriett Electric Manufacturing Company, Cincinnati, O., have prepared a very attractive pamphlet describing their direct current generators and motors. The company also manufacture alternating current motors and buffing and grinding machines.

MOLDERS' TOOLS. A very elegant catalogue and price list of molders' tools has been received from Burr's Damascus Tool Works, Detroit, Mich. Remarkably clear engravings show their wide lines of trowels, stove tools, gate cutters, spoons, bench lifters, etc. The company have a secret method of tempering which produces uniform results which, they state, are nearer the celebrated Damascus temper than any other method known to the trade.

CONTINUOUS SAND MIXER. We have just received from the J. S. McCormick Company, Pittsburg, Pa., a circular describing their continuous sand mixer. This machine is built on strictly mechanical lines, and is stated to thoroughly, quickly and economically accomplish the desired results. The machine consists of a drum which revolves with the material, and steel spiral knives which turn in the same direction, but at a speed three times that of the drum. By this means the mixture is cut, stirred and agitated until it is worked by the spiral to the discharge end of the drum, at which point it receives a sprinkling of water and is tempered before being thrown out ready for use. The mixer can be arranged to run either with belt or motor at no difference in cost.

VALVES, PRESSES AND DRAW BENCHES, POWER PUMPS AND ACCUMULATORS.—Under the general heading of Hydraulic Machinery, the last catalogue by the Waterbury Farrel Foundry and Machine Company, of Waterbury, Conn., covers the company's very extensive line of presses, draw benches, pumps, etc. The machinery here described is employed in the manufacture of tubing of all kinds, either seamless or brazed, of steel, copper, brass or other material; drawn rods and shafting; cups for tanks, hot water boilers, large cartridges, or similar articles; embossed and stamped coins, medals and watch cases; punching, drawing and piercing; stamping and pressing cold articles. The company is prepared to design and build new machines for special purposes or to adapt those they already have to uses other than those for which they were originally intended. The company will also plan and build the piping and valves suitable for connecting their pumps and accumulators with the machines they operate.

CATALOGUE BUREAU

THE METAL INDUSTRY has established a Catalogue Bureau by which it will prepare and do all the work necessary for the making of catalogues, pamphlets, circulars and other printed matter. Estimates will be furnished for writing the description, making engravings, printing, binding, in fact for the entire job from the beginning to the end or any part of it. Let us know your needs and we will tell you just exactly what we can do and what it will cost you. A catalogue should be a trade getter—that is the kind we produce. Write to the CATALOGUE BUREAU of THE METAL INDUSTRY, 61 Beekman street, New York.

METAL MARKET REVIEW

NEW YORK, July 5, 1907.

COPPER.—Standard Copper in London during the month of June has fluctuated more or less in sympathy with Wall Street and speculative sentiment generally. The market opened at £98 5s., touched £94, then advanced to £99 5s. and closed at £98, showing a net decline for the month of 5s. per ton, and an average for the month of about £97. The European statistics of copper as compiled abroad show that stocks increased 800 tons and afloats increased 300 tons, while the actual stocks of standard copper in London are said to be controlled by one house, holders are willing to let go on any little bulges that come along.

The home market continues in a very unsettled condition. At the moment there is more copper offering than the market can, or will, consume and the market in consequence can be called weak against that we are told that appearances are deceitful. We are told consumers are all bare of stock and will have to come in and buy for their actual requirements and the little lot of copper that is being offered around today can have no possible bearing on the copper market, producers are standing pat and claim to be all sold up for pretty well the month of July. It is quite a question whether consumers will have to come in and make heavy contracts for delivery, over the next three months—will their order books on new business justify it, and then it is quite a question whether producers are all sold up as closely as they claim to be. Conditions generally are rather better than they were a month ago, crops are not as bad as they were reported, simply a little later than usual, and confidence in the future is decidedly more pronounced. Whether business will respond to this change of sentiment remains to be seen. To get down to actual facts, stocks of copper abroad show a slight increase, while from America exports for the first six months of this year are only 81,145, against 101,565 tons for the same period last year, while our imports have increased over 16,000 tons, giving us 36,000 tons more available copper for home consumption than we had a year ago. Now, the point is has our consumption increased 36,000 tons over the same period last year. The consumption in England has decreased about 12,000 tons for the first six months of 1907. The copper market to-day is unsettled and nominal. Lake is quoted at 23 to 24, electrolytic 22½ to 23, and casting at from 20½ to 21 cents.

TIN.—The London tin market has been under control of the "bulls" and prices show a net advance for the month of over £5 per ton.

In the New York market the feature of the month has been the continued scarcity of spot tin and the price of spot tin reached 43¼ cents, while deliveries a few weeks off were selling 2 cents per pound lower. With the later arrivals this heavy premium has been wiped out and the market is on a nominal basis. The deliveries for the month are 3,050 tons, against 2,500 tons during May. The shipments for the month were 5,097 tons. The total deliveries since January 1, 1907, were 19,650 tons, against 21,000 tons during the same period of 1906. The market closes today steady at 43 cents for 5-10 ton lots spot, with July delivery about 25 points lower. Small lots 15 to 20 points higher.

LEAD.—The London market has been rather active, owing to a speculative short interest and a squeeze by the holders of the metal. London prices opened at £20, touched £19 12s. 6d., the lowest, and advanced rapidly to £21 5s., the highest point for the month, closing at £20.

In the New York market lead has been dull and easy to obtain, at the trust price of 5.75 New York basis, 50 ton lots. On July 3 the Trust suddenly dropped the price of lead ½ cent per pound, making New York 5.25 for 50-ton lots. Carload lots for quick delivery bring about 5.30 to 5.35½ cents New York. Smaller lots from store 5½ to 5¾ cents.

SPELTER.—The London spelter market has remained fairly steady during the month at around £24.

The New York market has been dull and flat, with prices continually being shaded, and while dealers were apparently bidding for round lots 6.35 or 6.37½, East St. Louis consumers were able to buy at 2½ points lower or better. The market closes weak and unsettled at 6.30 East St. Louis and 6.50@6.55 New York.

ANTIMONY.—The lowest official cables we get from London on antimony have been £54 for Halletts and £52 for other brands, while for the last three weeks antimony in London has been freely offered at £50, and today this price could be considerably shaded. On July 3 the London market came weak at £48 for Halletts and £45 for other brands.

In the New York market there are no buyers at any price. We hear of Hungarian antimony offering at 10c. duty paid New York for prompt shipment. July-August delivery, and no buyers at better than about 8½ cents. The market here and abroad is still weak and overbought, but there is bound to be a reaction before long. The market today is nominal. Cooksons around 12½ cents; Hallets, 11 to 12 cents; Hungarian grade from 10 to 11 cents, according to delivery.

ALUMINUM.—There is no change in this metal, the market is more or less nominal at from 47 to 50 cents per pound, according to delivery and quality.

SILVER.—The London market has ruled very steady at around 31d. in London and 67 to 67¼ cents New York.

SHEET METALS.—The base price of sheet copper is unchanged at 32 cents. There has been very little sheet copper sold at this price, as nearly all consumers were pretty well taken care of before this last advance was established, and the next move will undoubtedly be to a lower basis. Consumers are all busy and speak well of the outlook for continued good business.

OLD METALS.—The old metal market gets the "blues" quicker and more severely than any other market and this market has had quite a dose of it; but the last 10 days there is a decidedly better feeling and the outlook is better than for some time past. Prices are held fairly steady and the demand from consumers is gradually improving.

METAL MARKET REVIEW FOR THE FIRST SIX MONTHS OF 1907.

The year 1907 opened in the full flush of an unprecedented business expansion and it was predicted 1907 was to follow along the same lines. All business was good and apparently on a sound basis. The copper market was strong, Lake opened at 25¾ buyers and consumers could not place their orders quickly enough; the demand was good and insistent till March, when sales of Lake and Electrolytic were made at 26 cents, and casting copper sold at 25¼ cents; these will probably mark the high figures for the year. Since then we have had an easier market and buyers at the close are all holding off and prices are fully 2 to 5 cents per pound lower.

TIN.—In pig tin the speculators in London have entirely controlled the market for this metal and prices have fluctuated in sympathy with the London quotations. Tin opened at 42 cents, the highest point; 44.10 cents was reached in May, and the market to-day is 42.75.

LEAD.—The lead market has gradually worked off and the trust reduced prices 75 points since the first of the year.

SPELTER.—The foreign spelter market has declined about £2 per ton and the New York market has declined about quarter cent per pound.

ANTIMONY.—This metal has been especially weak and prices have dropped over £50 per ton.

The metal market to-day is dull and buyers in all lines are inclined to hold off and the outlook for the balance of the year is more or less uncertain.

See Advertising Page 23 following for Trade Wants

Metal Prices, July 8, 1907

METALS.	Price per lb.
COPPER, PIG, BAR AND INGOT AND OLD COPPER.	
Duty Free. Manufactured 2½c. per lb.	
Lake, car load lots	24.00
Electrolytic, car load lots	23.00
Casting, car load lots	21.00
TIN—Duty Free.	
Straits of Malacca, car load lots	43.00
LEAD—Duty Pigs, Bars and Old 2⅛c. per lb.; pipe and sheets 2½c. per lb.	
Pig lead, car load lots	5.35
SPELTER—Duty 1½c. per lb.	
Western, car load lots	6.50
ALUMINUM—Duty Crude, 8c. per lb. Plates, sheets, bars and rods 13c. per lb.	
Small lots .....Nominal	50.00
100 lb. lots..... "	49.00
Ton lots ..... "	48.00
ANTIMONY—Duty ¾c. per lb.	
Cookson's, cask lots, nominal	13.00
Halletts, cask lots	12.00
Other, cask lots	11.00
NICKEL—Duty 6c. per lb.	
Shot, Plaquettes, Ingots, Blocks, according to quantity	.45 to .60
MANGANESE—Duty 20%	.80
MAGNESIUM—Duty Free	$1.50
BISMUTH—Duty Free	1.50 to 1.55
CADMIUM—Duty Free	1.55 to 1.60
	Price per oz.
GOLD—Duty Free	$20.67
SILVER—Duty Free	.67
PLATINUM—Duty Free	30.00
QUICKSILVER—Duty 7c. per lb. Price per flask	41.00

OLD METALS.	Price per lb.	
Heavy Cut Copper	19.00	19.50
Copper Wire	19.00	19.50
Light Copper	16.00	17.00
Heavy Mach. Comp	16.00	17.00
Heavy Brass	12.00	13.00
Light Brass	10.00	10.50
No. 1 Yellow Brass Turnings	11.00	11.50
No. 1 Comp. Turnings	14.00	14.50
Heavy Lead	4.00	4.10
Zinc Scrap	4.50	5.00
Scrap Aluminum, sheet, pure	30.00	32.00
Scrap Aluminum, cast, alloyed	25.00	30.00
Scrap Aluminum, turnings	10.00	13.00
Old Nickel, solid	18.00	25.00
No. 1 Pewter	30.00	31.00

	Price per lb.
SILICON COPPER, according to quantity	35 to 39
PHOSPHOR COPPER, 5%	25 to 27
Phosphor Tin	47 to 48
Brass Ingot, Yellow	15 to 17
Brass Ingot, Red	18 to 21
Bronze Ingot	17 to 20
Manganese Bronze	20 to 22
Phosphor Bronze	22 to 25

ZINC—Duty, sheet, 2c. per lb.	Price per lb.
600 lb. casks	9.10
Open casks	9.60

PHOSPHORUS—Duty 18c. per lb.	
According to quantity	35 to 45

PRICES OF SHEET COPPER.

SIZES OF SHEETS.		96oz. & over 75 lb. sheet 30x60 and heavier	64oz. to 96oz. 50 to 75 lb. sheet 30x60	32oz. to 64oz. 25 to 50 lb. sheet 30x60	24oz. to 32oz. 18¾ to 25 lb. sheet 30x60	16oz. to 24oz. 12½ to 18¾ lb. sheet 30x60	14oz. and 15oz. 11 to 12½ lb. sheet 30x60
		CENTS PER POUND.					
Not wider than 30 ins.	Not longer than 72 ins.	32	32	32	32	32	33
	Longer than 72 ins. Not longer than 96 ins.	32	32	32	32	32	33
	Longer than 96 ins.	32	32	32	32	32	34
Wider than 30 ins. but not wider than 36 ins.	Not longer than 72 ins.	32	32	32	32	32	34
	Longer than 72 ins. Not longer than 96 ins.	32	32	32	32	32	34
	Longer than 96 ins. Not longer than 120 ins.	32	32	32	32	33	35
	Longer than 120 ins.	32	32	32	33	34	
Wider than 36 ins. but not wider than 48 ins.	Not longer than 72 ins.	32	32	32	33	34	36
	Longer than 72 ins. Not longer than 96 ins.	32	32	32	33	35	37
	Longer than 96 ins. Not longer than 120 ins.	32	32	32	34	36	40
	Longer than 120 ins.	32	32	33	35	38	
Wider than 48 ins. but not wider than 60 ins.	Not longer than 72 ins.	32	32	32	33	35	38
	Longer than 72 ins. Not longer than 96 ins.	32	32	32	34	36	41
	Longer than 96 ins. Not longer than 120 ins.	32	32	33	35	38	
	Longer than 120 ins.	33	33	34	36	40	
Wider than 60 ins. but not wider than 72 ins.	Not longer than 96 ins.	32	32	33	35	40	
	Longer than 96 ins. Not longer than 120 ins.	32	32	34	37	42	
	Longer than 120 ins.	33	33	35	40		
Wider than 72 ins. but not wider than 108 ins.	Not longer than 96 ins.	33	33	35	38		
	Longer than 96 ins. Not longer than 120 ins.	34	34	36	39		
	Longer than 120 ins.	35	35	37	41		
Wider than 108 ins.	Not longer than 132 ins.	36	36	38			
	Longer than 132 ins.	37	37	40			

Rolled Round Copper, ⅝ inch diameter or over, 32 cents per pound. (Cold Drawn, Square and Special Shapes, extra.)

Circles, Segments and Pattern Sheets three (3) cents per pound advance over prices of Sheet Copper required to cut them from.

All Cold or Hard Rolled Copper, 14 ounces per square foot and heavier, one (1) cent per pound over the foregoing prices.

All Cold or Hard Rolled Copper, lighter than 14 ounces per square foot, two (2) cents per pound over the foregoing prices.

Cold Rolled and Annealed Copper, Sheets and Circles, take the same price as Cold or Hard Rolled Copper of corresponding dimensions and thickness.

All Polished Copper, 20 inches wide and under, one (1) cent per pound advance over the price for Cold Rolled Copper.

All Polished Copper, over 20 inches wide, two (2) cents per pound advance over the price for Cold Rolled Copper.

Planished Copper, one (1) cent per pound more than Polished Copper.

Cold Rolled Copper prepared suitable for polishing, same prices and extras as Polished Copper.

Tinning Sheets, on one side, 3½c. per square foot.

For tinning both sides, double the above price.

For tinning the edge of sheets, one or both sides, price shall be the same as for tinning all of one side of the specified sheet.

Metal Prices, July 8, 1907

Net Cash Prices.

COPPER BOTTOMS, PITS AND FLATS.

14 oz. to square foot, and heavier, per lb.	36c.
12 oz. and up to 14 oz. to square foot, per lb.	37c.
10 oz. and up to 12 oz.	39c.
Lighter than 10 oz.	42c.

Circles less than 8 in. dia., 2c. per lb. additional.
Circles over 13 in. dia. are not classed as Copper Bottoms.
Polished Copper Bottoms and Flats, 1c. per lb. extra.

PRICES ON BRASS MATERIAL.

In Effect January 21, 1907, and Until Further Notice.

To customers who purchase less than 5,000 pounds per month and over 5,000 pounds per year.

	Net base per lb. High Brass.	Low Brass.	Bronze.
Sheet	$0.22¾	$0.26	$0.28¼
Wire ¼" and larger	.23	.26¼	.28½
Wire smaller than ¼" to No. 8, inclusive	.23¾	.27	.29¼
Wire smaller than No. 8 to No. 10, inclusive	.24¼	.27½	.29¾
Rods smaller than ½" diameter	.23¼	.26½	.29¾
Rods ½" to 1" diameter, inclusive	.23	.26¼	.29½
Brazed brass tubing	.29⅞	—	—
Brazed Bronze and Copper Tubing	—	—	.33¼
Open Seam Brass Tubing	.27⅛	—	—
Open Seam Bronze Tubing	—	—	.31¼
Brass angle and channel	.29⅛	—	—
Bronze angle and channel	—	—	.33⅜

15% discount from all extras.

To customers who purchase less than 5,000 pounds per year.

	Net base per lb. High Brass.	Low Brass.	Bronze.
Sheet	$0.23¾	$0.27	$0.29¼
Wire ¼" and larger	.24	.27¼	.29½
Wire smaller than ¼" to No. 8, inclusive	.24¾	.28	.30¼
Wire smaller than No. 8 to No. 10, inclusive	.25¼	.28½	.30¾
Rods smaller than ½" diameter	.24¼	.27½	.30¾
Rods ½" to 1" diameter, inclusive	.24	.27¾	.30½
Brazed brass tubing	.30⅞	—	—
Brazed bronze and copper tubing	—	—	.34¼
Open seam brass tubing	.28⅛	—	—
Open seam bronze tubing	—	—	.32¼
Brass angle and channel	.30⅞	—	—
Bronze angle and channel	—	—	.34⅜

5% discount from all extras.

PRICES FOR SEAMLESS BRASS TUBING.

From 1¼ to 3½ in. O. D. Nos. 4 to 13 Stubs Gauge, 27c. per lb.
Seamless Copper Tubing, 32c. per. lb.

For other sizes see Manufacturers' List.

PRICES FOR SEAMLESS BRASS TUBING Iron Pipe Sizes.

Iron Pipe Size.	⅛	¼	⅜	½	¾	1	1¼	1½	2	2½	3	3½	4	4½	5	6
Price per lb.	35	34	29	28	27	27	27	27	27	27	27	28	29	31	33	34

PRICE LIST OF IRON LINED TUBING—NOT POLISHED.

	Per 100 Feet. Brass.	Bronze.
⅜ inch	$8.00	$9.00
½ inch	8.00	9.00
⅝ inch	10.00	11.00
¾ inch	12.00	13.00
⅞ inch	14.00	15.00
1 inch	18.00	20.00
1¼ inch	22.00	24.00
1½ inch	25.00	27.00
1¾ inch	32.00	35.00
1¾ inch	45.00	48.00
2 inch	56.00	60.00

Discount 30 per cent.

GERMAN SILVER TUBING.

4	per cent.	to	No. 19,	B. & S.	Gauge,	inclusive	$0.60
8	"	"	19,	"	"	"	.70
9	"	"	19,	"	"	"	.85
12	"	"	19,	"	"	"	1.00
15	"	"	19,	"	"	"	1.15
16	"	"	19,	"	"	"	1.20
18	"	"	19,	"	"	"	1.30

German Silver Tubing thinner than No. 19 B. & S. Gauge add same advances as for Brazed Brass Tube.

For cutting to special lengths add same advances as for Brazed Brass Tube. Discount 10 per cent.

Prices on Sheet Block Tin and Britannia Metal.

Not over 18 in. in width, not thinner than 23 B. S. Gauge, 4c. above price of pig tin in same quantity.

Not over 35 in. in width, not thinner than 22 B. S. Gauge, 5c. above price of pig tin.

Price of Sheet Silver—

Rolled sterling silver .925 fine is sold according to gauge quantity and market conditions. No fixed quotations can be given as prices range from 2c. below to 6c. above the price of bullion.

Rolled silver anodes .999 fine are quoted at 2c. above the price of bullion.

PRICE LIST FOR SHEET ALUMINUM—B. & S. Gauge.

Wider than and including	*3in. 12in.	6in. 14in.	14in. 16in.	16in. 18in.	18in. 20in.	20in. 24in.	24in. 30in.	30in. 36in.	36in. 40in.	Cutting to Length.	Polishing or Satin Finishing one Side.
	in coils.										
No. 13 and heavier	47	47	49	49	49	49	52	52	52	1	2
" 14	47	47	49	49	49	49	52	52	52	1	2
" 15	47	47	49	49	49	49	52	52	52	1	2
" 16	47	47	49	49	49	49	52	52	52	1	2
" 17	47	47	49	49	49	49	52	52	52	1	3
" 18	47	47	49	49	49	49	52	52	55	1	3
" 19	47	47	49	49	49	49	52	53	56	1	4
" 20	47	49	49	49	49	51	54	55	57	1	4
" 21	47	51	51	51	51	53	56	57	63	2	5
" 22	47	51	51	51	53	53	56	60	64	2	5
" 23	47	51	51	51	53	53	56	62	65	2	6
" 24	47	51	53	55	55	55	58	64	67	2	6
" 25	49	52	54	56	56	56	59	66	70	2	7
" 26	49	52	55	59	59	59	64	68	74	2	8
" 27	49	53	57	61	61	62	67	71	77	2	10
" 28	49	53	59	61	62	62	69	75	80	2	11
" 29	51	54	61	63	65	65	74	80	85	2	13
" 30	51	53	63	65	69	75	82	85	90	2	15
" 31	56	60	68	71	76	84	87	90	96	3	17
" 32	58	62	70	74	82	90	97	103	108	3	19
" 33	60	64	73	78	86	97	104	113	123	3	21
" 34	63	68	75	83	91	104	116	123	133	3	25
" 35	..	78	83	93	103	113	128	138	..	..	..
" 36	..	93	103	113	128	133	148	..	..	..	..
" 37	..	117	121	142	157	172	187	..	..	..	..
" 38	..	137	152	167	182	197	217	..	..	..	..
" 39	..	157	177	197	217	237	..	..	..	..	..
" 40	..	187	217	237	257	..	..	..	..	..	..

*Polished or scratch brushed 2 sides, double above prices.

Advance is asked over list prices owing to scarcity of material.

In flat rolled sheets the above prices refer to lengths between 2 and 8 feet. Prices furnished by the manufacturers for wider and narrower sheet. All columns except the first refer to flat rolled sheet. Prices are for 50 lbs. or more at one time. Less quantities 5c. lb. extra. Charges made for boxing.

PRICES LIST OF SEAMLESS ALUMINUM TUBING—STUBS' GAUGE.

Stubs' G.	¼"	⅜"	½"	⅝"	¾"	1"	1½"	2"	2½"	2¾"
4 to 11	..	..	96	86	83	77	67	61	61	61
12	..	1.08	96	86	83	77	67	61	61	61
13	..	1.08	96	86	83	77	67	64	64	64
14	..	1.08	96	86	83	77	67	64	64	64
15	..	1.12	96	89	86	80	70	67	67	67
16	..	1.15	99	93	89	83	70	70	70	70
17	..	1.18	1.02	96	93	86	73	73	73	73
18	1.85	1.24	1.05	99	93	86	77	77	77	80
19	1.88	1.28	1.08	1.02	99	93	83	80	80	83
20	1.95	1.31	1.15	1.08	1.05	99	89	86	86	89
21	2.01	1.37	1.21	1.15	1.12	1.05	99	93	93	96
22	2.17	1.44	1.24	1.18	1.15	1.08	1.05	99	1.05	1.05
23	2.33	1.50	1.31	1.24	1.21	1.15	1.15	1.08	1.15	1.15
24	2.48	1.60	1.37	1.31	1.28	1.18	1.21	1.21	1.24	..
25	2.65	1.69	1.47	1.37	1.34	1.28	1.34	..	..	..

Prices are for lots of 50 lbs. Boxing extra. Smaller, larger and intermediate sizes furnished by manufacturers.

PRICE LIST FOR ALUMINUM ROD AND WIRE—B. & S. GAUGE.

Diameter B. & S. G'ge	000 to No. 10.	No. 11.	No. 12.	No. 13.	No. 14.	No. 15.	No. 16.	No. 17.	No. 18.	No. 19.	No. 20.	No. 21.	No. 22.
Price, per lb.	43	43½	43½	44	44½	45	45½	46	47	48	49	52	57

200 lbs. to 30,000 lbs., 3 cents off list; 30,000 lbs. and over, 4 cents off list.

PRICE LIST FOR GERMAN SILVER IN SHEETS AND ROLLS.

Per cent.	Price per lb.	Per cent.	Price per lb.
12	$0.52	16	$0.58
13	.53	17	.59
14	.54	18	.60
15	.55		

These prices are for sheets and rolls over 2 inches in width, to and including 8 inches in width and to No. 20, inclusive, American or Brown & Sharpe's Gauge. Prices are for 100 lbs. or more of one size and gauge in one order. Discount 30 per cent.

Munts or Yellow Metal Sheathing (14" x 48")			22c. lb. net base.
" " "	Rectangular Sheets other than Sheathing		24c. " " "
" " "	Rod		23c. " " "
Tobin Bronze Rod			25c. " " "

Above are for 100 lbs. or more in one order.

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The accompanying cut illustrates a new model Weston Voltmeter expressly designed to meet the requirements of Electroplaters, Electrotypers and others engaged in the art of Electrometallurgy. It is accurate and thoroughly reliable. It is built in a thoroughly substantial manner; the workmanship is high grade. It is provided with a 15 point switch so that the difference of potential can be determined at any one of 15 tanks or all of them successively.

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we have been manufacturing a high-grade Acid-Proof Vitrified Non-Absorbent Brick suitable for Acid Tanks, Plating Room flooring, etc., etc.

These brick immersed in a 50% Sulphuric Acid solution for several months show no signs of deterioration.

We also have the same material pulverized to mix with Portland Cement in place of Sand in laying the Brick.

INQUIRIES SOLICITED.

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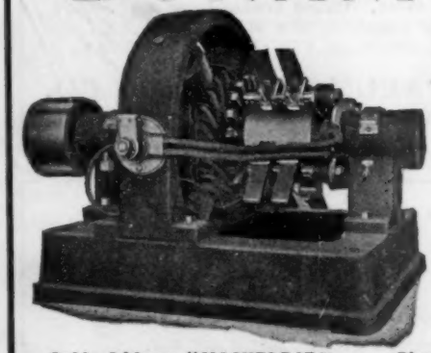

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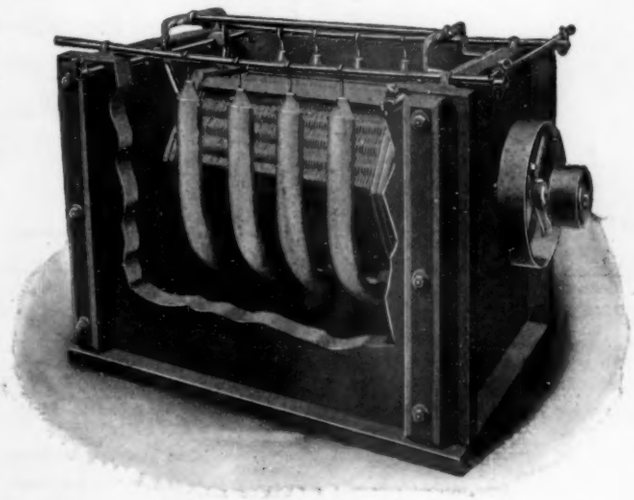

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No Stringing. No Wire Used.
No Metal Plating Trays or Baskets.
No Unstringing. No Loss of Metal.

Capacity: 50 lbs. to 500 lbs., according to size.

Basket can be removed at will—without interfering with drive. In larger sizes basket is raised and lowered automatically.

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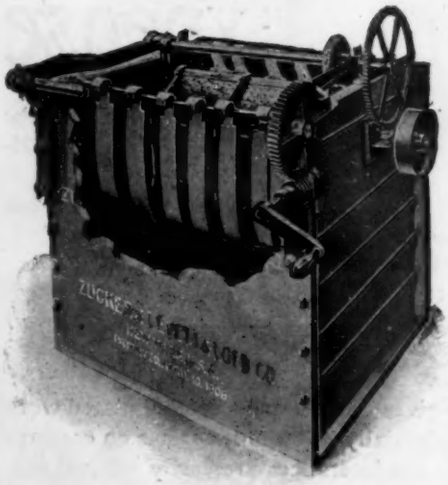

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All sorts of small work, such as nuts, bolts, screws, etc., can be economically and quickly Plated and Finished at one operation, labor of stringing also being done away with. The apparatus is fitted with a Crank and Gear by which the cylinder can be raised out of the solution to receive or discharge work. We make for this apparatus special curved anodes so that the anode surface is at all points equidistant from the work.

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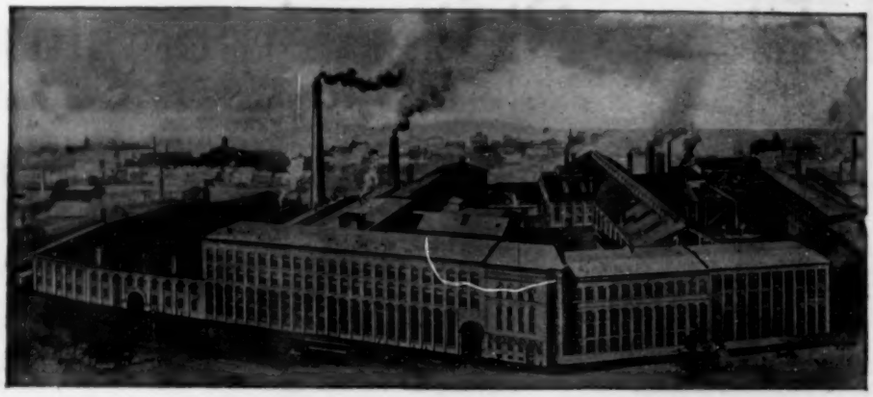

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